5626

PRELIMINARY ASSESSMENT (PA) REPORT
TRUE TEMPER SPORTS, INC.
MSD982095713
OLIVE BRANCH, DESOTO COUNTY, MISSISSIPPI

NFRAP APPROVED
BJ 10/26/94

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF POLLUTION CONTROL
HAZARDOUS WASTE DIVISION
P. O. BOX 10385
JACKSON, MISSISSIPPI 39289-0385

October 17, 1994

PREPARED BY:

Bill Gilliland

APPROVED BY:

Phillip Weathersby

TABLE OF CONTENTS

Introduction

The Mississippi Department of Environmental Quality, Office of Pollution Control (MS OPC), has conducted a Preliminary Assessment (PA) of the the True Temper Sports, Inc. facility located in Olive Branch, DeSoto County, Mississippi. The PA was performed under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA). Location of the facility is Latitude 34°59'12" North, Longitude 89°47'27" West; SW 1/4, NW 1/4, Section 24, Township 1 South, Range 6 West, DeSoto County, Mississippi (Reference 3).

Background and Regulatory History

True Temper Sports, Inc., at this facility, manufactures carbon graphite golf shafts, carbon graphite bicycle frame tubes, and aluminum gas pump nozzles. A Notificiation of Regulated Waste Activity form was submitted to the Mississippi Department of Natural Resources in March 1987 and EPA ID No. MSD982095713 was issued the facility in June 1987 (Reference 4). This facility does not have a National Pollutant Discharge Elimination System (NPDES) or Pretreatment Permit (Reference 16).

Waste Characteristics

Initially, in 1987, this facility filed and was listed as a small quantity generator. In 1992 they requested their generator status be changed from a small quantity generator to a large quantity generator. Waste products include spent halogenated solvents (F005) such as toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, and benzene (Reference 4). It is estimated that approximately 3,000 pounds of waste per month is generated at this facility.

Groundwater Pathway

Mississippi is located in the Gulf Coastal Plain of North America. The state is divided into twelve physiographic provinces. Eastern DeSoto County, the location of the facility, is in the Loess Hills province.

The facility is underlain by about 75 feet of terrace deposits which are chiefly comprised of sand and gravel. Underlying the terrace deposits is approximately 50 feet of sand of the Cockfield formation. The Cockfield is underlain by some 55 feet of silt and clay of the Cook Mountain formation, which is underlain by the Sparta (Kosciusko) formation. Underlying the Sparta formation, in descending order, are the Tallahatta, Meridian, and Wilcox formations. The Sparta is the predominantly used aquifer for both private and public wells in the area. Other aquifers utilized for water are the Tallahatta and the Meridian/Upper Wilcox aquifers. The Sparta is separated from the overlying formation and terrace deposits by approximately 55 feet of silt and clay of the Cook Mountain formation. The Sparta aquifer has a maximum thickness of about 120 feet (References 3, 4, 5, 18 and 19).

The Industrial park has its own system of wells and supplies water to the companies in the park. The nearest well, a home well, is located 2650 feet northeast of the facility, has a depth of 200 feet, and is in the Sparta aquifer. The nearest industrial park well is 2900 feet west of the facility, has a depth of 340 feet, and is in the Sparta aquifer. The nearest public supply well is about 3.2 miles west of the facility.

The estimated population served by water wells within the four-mile radius of the facility is given below (References 3, 5, 6, and 7).

Distance, Miles	Home Wells	Public Wells	Well Connections	Total Population
0 - 1/4	0	0	0	0
1/4 - 1/2	0	0	0	0
1/2 - 1	3	2*	0	1009
1 - 2	16	0	0	47
2 - 3	12	0	0	35
3 - 4	14	11	771	2284

*Industrial Park Well. Population is estimated at 500 employees (each well) for this facility and the surrounding plants.

The base of the fresh water is approximately 1900 feet below sea level (Reference 18).

Climate and Soils

Annual precipitation for the Olive Branch, DeSoto County area is 51 inches (Reference 8). Mean annual lake evaporation is about 41 inches; thus, the resultant net precipitation is 10 inches (Reference 15).

Based on the soil survey map of DeSoto County there exist two predominant soils at the facility. The Calhoun silt loam is an old alluvium developed from loessal soils. The Grenada silt loam is a moderately well drained soil in the Loess Hills uplands (Reference 12).

Surface Water Pathway

Surface water flows north overland for about 200 feet and enters an unnamed intermittent drainage. After about 3.6 miles the unnamed intermittent drainage joins an unnamed perennial tributary to

Nonconnah Creek. The 15-mile pathway ends in Nonconnah Creek. Topographic maps do not indicate the presence of any wetlands along the 15-mile surface water pathway (Reference 3).

There are no endangered or threatened aquatic species known to inhabit the waters of Nonconnah Creek or its tributaries (References 13 and 14).

There are no drinking water intakes located along the 15-mile surface water pathway (Reference 17). The facility is located above the 500 year floodplain (Reference 11).

Soil Pathway

The facility is located in an industrial park approximately two miles northeast of Olive Branch, Mississippi. The majority of the area surrounding the facility is small farms and industrial (in the industrial park). There are about 75 employees at the facility. The estimated residential population living within one mile of the facility is 76. The nearest resident is 2500 feet southwest of the facility. There is no school or day care center within 200 feet of the facility (References 3, 4, and 7).

There are no endangered or threatened terrestrial species listed specifically for DeSoto County, although several species are listed for the entire state. These include the Florida panther, Bald eagle, Bachman's warbler, and the Red-cockaded woodpecker (References 13 and 14).

Conclusions

The MS OPC concludes that no further action is warrented under the CERCLA program.

REFERENCES

1. Environmental Protection Agency, 40 CFR Part 300, Hazard Ranking System; Final Rule, Federal Register, Vol. 55, Friday, December 14, 1990.

2. Superfund Chemical Data Matrix (SCDM), U. S. EPA.

3. Topographic Maps of the True Temper Sports, Inc. Area, Olive Branch, Mississippi.

   Olive Branch, MS Quadrangle - 7.5 Minute Series
   Byhalia NW, Quadrangle - 7.5 Minute Series

4. Information from the MS OPC Hazardous Waste Division files on True Temper Sports, Inc., Olive Branch, Mississippi.

5. Printout from U. S. Geological Survey Data Base of Wells Within the True Temper Sports, Inc., Olive Branch, Mississippi Study Area.

6. Information on Public Water Supply Wells in DeSoto County, Mississippi, from the Water Supply Division, Mississippi State Department of Health, Division of Water Supply.

7. Average Population per Household, DeSoto County, Mississippi, April 1990 Census.

8. Mean Annual Precipitation Map, 1951-1980, Tishomingo County Geology and Mineral Resources, by Robert K. Merrill, Mississippi Bureau of Geology, p. 13.

9. Average Flow at Selected Streamgaging Sites, Sources for Water Supplies in Mississippi, by B. E. Wasson, U. S. Geological Survey, Revised 1986, p. 7.

10. Two-Year, 24-Hour Rainfall Map, "Rainfall Frequency Atlas of the United States," by David M. Hershfield, U. S. Department of Commerce, Technical Paper No. 40, 1961.

11. Flood Insurance Rate Map, 1978, DeSoto County, Mississippi, Map No. 280050, Panel 0003A of 0008.

12. United States Department of Agriculture, Soil Survey, DeSoto County, Mississippi, 1959, pp. 3, 6, 13, 19, 20, Legend and Plates 7 and 8 (in part).

13. U. S. Fish and Wildlife Service:

Vicksburg Office, Species List by County;
Jackson Office, Topographic Maps Indicating Sensitive Environments;
Region IV - Atlanta, "Endangered and Threatened Species."

14. "Endangered Species of Mississippi, 1992," Mississippi Department of Wildlife, Fisheries and Parks, Museum of Natural Science.

15. Average Annual Lake Evaporation Map, "Evaporation Maps for the United States," by M. A. Kohler, T. J. Nordenson, and D. R. Baker, U. S. Department of Commerce, Weather Bureau, Technical Paper No. 37, Plate 1.

16. Information from the MS OPC Industrial Wastewater Control Branch files, True Temper Sports, Inc., Olive Branch, Mississippi Facility.

17. Information on groundwater and surface water use from the Mississippi Office of Land and Water Resources, Jackson, Mississippi.

18. <u>Water for Industrial and Agricultural Development in Coahoma, DeSoto, Panola, Quitman, Tate, and Tunica Counties, Mississippi</u>, 1976: U. S. Geological Survey and the Mississippi Research and Development Center, pp. 4, 8, 13, 15, 38, 40, and 43-47.

19. <u>Marshall County Geology</u>, 1954: by Franklin Earl Vestal, Mississippi State Geological Survey, pp. 11, 14, 20, 21, and Geologic Map (in part).

federal register

Friday
December 14, 1990

Part II

Environmental Protection Agency

40 CFR Part 300
Hazard Ranking System; Final Rule

REFERENCE 1

SUPERFUND CHEMICAL DATA MATRIX

9 March 1993

REFERENCE 2

OVERSIZED

DOCUMENT

EMHART
CONSUMER GROUP

TRUE TEMPER SPORTS DIVISION
Emhart Consumer Group
P.O. Drawer E
Amory, Mississippi 38821
Phone: (601) 256-5605

TRUE TEMPER

March 16, 1987

RECEIVED
MAR 1 1987
DEPT. OF NATURAL RESOURCE
BUREAU OF POLLUTION CONTROL

Mr. Walter Huff
Mississippi Department of Natural Resources
Bureau of Pollution Control
P. O. Box 10385
Jackson, Mississippi 39209

Dear Mr. Huff:

Enclosed is a Notification of Hazardous Waste Activity for the True Temper Sports facility at Olive Branch. They are applying for an EPA I. D. number as a small quantity generator (less than 100 kg/mo.). This quantity does not include the off-specification raw material for which I am still trying to arrange disposal.

If you have any further questions, please contact me or Joe Kaferle at the Olive Branch facility.

Sincerely,

Michael L. Justice

Michael L. Justice

MLJ:ar

Enclosure (1)

PC: Joe Kaferle
Dan Hazel

Reference 4

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

Form Approved. OMB No. 2050-0028. Expires 9-30-88.
GSA No. 0246-EPA-OT

United States Environmental Protection Agency
Washington, DC 20460

EPA Notification of Hazardous Waste Activity

Please refer to the *Instructions for Filing Notification* before completing this form. The information requested here is required by law (*Section 3010 of the Resource Conservation and Recovery Act*).

For Official Use Only

Comments

C

C

Installation's EPA ID Number	T/A C	Approved	Date Received (yr. mo. day)	
C F MSD982095713	1			033 DeSoto

I. Name of Installation

TRUE TEMPER SPORTS DIVISION

II. Installation Mailing Address

Street or P.O. Box

C 3 8706 DEERFIELD DRIVE

City or Town	State	ZIP Code
C 4 OLIVE BRANCH	MS	38654

III. Location of Installation

Street or Route Number

C 5 8706 DEERFIELD DRIVE

City or Town	State	ZIP Code
C 6 OLIVE BRANCH	MS	38654

IV. Installation Contact

Name and Title (last, first, and job title)	Phone Number (area code and number)
C 2 KAFERLE JOSEPH	601 8954142

V. Ownership

A. Name of Installation's Legal Owner	B. Type of Ownership (enter code)
C R TRUE TEMPER SPORTS DIV	P

VI. Type of Regulated Waste Activity (Mark 'X' in the appropriate boxes. Refer to instructions.)

A. Hazardous Waste Activity

- ☒ 1a. Generator ☒ 1b. Less than 1,000 kg/mo.
- ☐ 2. Transporter
- ☐ 3. Treater/Storer/Disposer
- ☐ 4. Underground Injection
- ☐ 5. Market or Burn Hazardous Waste Fuel (*enter 'X' and mark appropriate boxes below*)
  - ☐ a. Generator Marketing to Burner
  - ☐ b. Other Marketer
  - ☐ c. Burner

B. Used Oil Fuel Activities

- ☐ 6. Off-Specification Used Oil Fuel (*enter 'X' and mark appropriate boxes below*)
  - ☐ a. Generator Marketing to Burner
  - ☐ b. Other Marketer
  - ☐ c. Burner
- ☐ 7. Specification Used Oil Fuel Marketer (*or On site Burner*) Who First Claims the Oil Meets the Specifications

VII. Waste Fuel Burning: Type of Combustion Device (*enter 'X' in all appropriate boxes to indicate type of combustion device(s) in which hazardous waste fuel or off-specification used oil fuel is burned. See instructions for definitions of combustion devices.*)

☐ A. Utility Boiler ☐ B. Industrial Boiler ☐ C. Industrial Furnace

VIII. Mode of Transportation (*transporters only — enter 'X' in the appropriate box(es)*)

☐ A. Air ☐ B. Rail ■ C. Highway ☐ D. Water ☐ E. Other (*specify*)

IX. First or Subsequent Notification

Mark 'X' in the appropriate box to indicate whether this is your installation's first notification of hazardous waste activity or a subsequent notification. If this is not your first notification, enter your installation's EPA ID Number in the space provided below.

☒ A. First Notification ☐ B. Subsequent Notification (*complete item C*)

C. Installation's EPA ID Number

EPA Form 8700-12 (Rev. 11-85) Previous edition is obsolete.

Continue on reverse

ID — For Official Use Only														
C													T/A	C
W														1

X. Description of Hazardous Wastes *(continued from front)*

A. Hazardous Wastes from Nonspecific Sources. Enter the four-digit number from 40 *CFR* Part 261.31 for each listed hazardous waste from nonspecific sources your installation handles. Use additional sheets if necessary.

1	2	3	4	5	6
7	8	9	10	11	12

B. Hazardous Wastes from Specific Sources. Enter the four-digit number from 40 *CFR* Part 261.32 for each listed hazardous waste from specific sources your installation handles. Use additional sheets if necessary.

13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30

C. Commercial Chemical Product Hazardous Wastes. Enter the four-digit number from 40 *CFR* Part 261.33 for each chemical substance your installation handles which may be a hazardous waste. Use additional sheets if necessary.

31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48

D. Listed Infectious Wastes. Enter the four-digit number from 40 *CFR* Part 261.34 for each hazardous waste from hospitals, veterinary hospitals, or medical and research laboratories your installation handles. Use additional sheets if necessary.

49	50	51	52	53	54

E. Characteristics of Nonlisted Hazardous Wastes. Mark "X" in the boxes corresponding to the characteristics of nonlisted hazardous wastes your installation handles. *(See 40 CFR Parts 261.21—261.24)*

☒ 1. Ignitable *(D001)*   ☐ 2. Corrosive *(D002)*   ☐ 3. Reactive *(D003)*   ☐ 4. Toxic *(D000)*

XI. Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature	Name and Official Title *(type or print)*	Date Signed
Joseph Kaferle	JOSEPH KAFERLE / PLANT MGR.	3/6/87

EPA Form 8700-12 (Rev. 11-85) Reverse

FILE COPY

June 15, 1987

Mr. Joseph Kaferle
True Temper Sports Division
8706 Deerfield Drive
Olive Branch, Mississippi 38654

Dear Mr. Kaferle:

Enclosed please find a photocopy of the Notification of Hazardous Waste Activity form for your facility. The assigned Environmental Protection Agency identification number, MSD982095713, should be used on all manifested shipments of hazardous waste and on all correspondence regarding hazardous waste.

If we may be of further assistance, please feel free to contact us.

Sincerely,

Sandra Evans, Secretary
Hazardous Waste Division

SE:dmh
Enclosure

Please print or type with ELITE type (12 charact-- per inch) in the unshaded areas only

Form Approved. OMB No. 2050-0028. Expires 9-30-88.
GSA No. 0246-EPA-OT

United States Environmental Protection Agency
Washington, DC 20460

EPA Notification of Hazardous Waste Activity

Please refer to the *Instructions for Filing Notification* before completing this form. The information requested here is required by law (*Section 3010 of the Resource Conservation and Recovery Act*).

For Official Use Only

Comments

C

C

Installation's EPA ID Number: MSD 98-209-5713

T/A C: 1

Approved | Date Received (yr. mo. day)

033 DESOTO

I. Name of Installation

TRUE TEMPER SPORTS DIVISION

II. Installation Mailing Address

Street or P.O. Box: 8706 DEERFIELD DRIVE

City or Town: OLIVE BRANCH | State: MS | ZIP Code: 38654

III. Location of Installation

Street or Route Number: 8706 DEERFIELD DRIVE

City or Town: OLIVE BRANCH | State: MS | ZIP Code: 38654

IV. Installation Contact

Name and Title (last, first, and job title) | Phone Number (area code and number)

KAFERLE JOSEPH | 601 8954142

V. Ownership

A. Name of Installation's Legal Owner: TRUE TEMPER SPORTS DIV.

B. Type of Ownership (enter code): P

VI. Type of Regulated Waste Activity (Mark 'X' in the appropriate boxes. Refer to instructions.)

A. Hazardous Waste Activity

1a. Generator [X] 1b. Less than 1,000 kg/mo.

2. Transporter

3. Treater/Storer/Disposer

4. Underground Injection

5. Market or Burn Hazardous Waste Fuel (enter 'X' and mark appropriate boxes below)

a. Generator Marketing to Burner

b. Other Marketer

c. Burner

(or On-site Burner)

Meets the Specification

VII. Waste Fuel Burning: Type of Combustion Device ... type of combustion device(s) in which waste fuel or off-specification used oil fuel is burned ...

A. Utility Boiler

Furnace

VIII. Mode of Transportation (transporters only — ...)

B. Rail C. Highway D. Water

IX. ... Subsequent Notification

EPA Form 8700-12 (Rev. 11-85) Previous edition is obsolete.

Continue on reverse

ID — For Official Use Only														
C													T/A	C
W														1

X. Description of Hazardous Wastes *(continued from front)*

A. Hazardous Wastes from Nonspecific Sources. Enter the four-digit number from 40 CFR Part 261.31 for each listed hazardous waste from nonspecific sources your installation handles. Use additional sheets if necessary.

1	2	3	4	5	6
7	8	9	10	11	12

B. Hazardous Wastes from Specific Sources. Enter the four-digit number from 40 *CFR* Part 261.32 for each listed hazardous waste from specific sources your installation handles. Use additional sheets if necessary.

13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30

C. Commercial Chemical Product Hazardous Wastes. Enter the four-digit number from 40 *CFR* Part 261.33 for each chemical substance your installation handles which may be a hazardous waste. Use additional sheets if necessary.

31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48

D. Listed Infectious Wastes. Enter the four-digit number from 40 *CFR* Part 261.34 for each hazardous waste from hospitals, veterinary hospitals, or medical and research laboratories your installation handles. Use additional sheets if necessary.

49	50	51	52	53	54

E. Characteristics of Nonlisted Hazardous Wastes. Mark "X" in the boxes [illegible] hazardous wastes your installation handles. *(See 40 CFR Parts 261.21 — 261.24)*

☒ 1. Ignitable *(D001)* ☐ 2. Corrosive *(D002)* ☐ 3. Reactive *(D003)* ☐ 4. Toxic *(D000)*

XI. Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature	Name and Official Title *(type or print)*	Date Signed
Joseph Kaferle	JOSEPH KAFERLE / PLANT MGR.	3/6/87

True Temper Sports™

8706 Deerfield Drive
Olive Branch, MS 38654

601-895-4142
601-895-8668 Fax

RECEIVED
OCT 2 1 1992
Dept. of Environmental Quality
Office of Pollution Control

October 7, 1992

State of Mississippi
Department of Environmental Quality
Bureau of Pollution Control
P.O. Box 10385
Jackson, MS 39289-0385

Gentlemen:

Due to increased volume and expansion it has become necessary to change our generator status to large quantity generator for 1992. Enclosed is a Notification of Regulated Waste Activity which will reflect this change. True Temper Sports, Olive Branch is currently in the process of upgrading equipment, procedures, and reporting for regulatory compliance as a large quantity generator. As always, True Temper continues all efforts to minimize waste generation now, and in the future.

Sincerely,

Lee McAdams

Lee McAdams

STATE OF MISSISSIPPI
DEPARTMENT OF ENVIRONMENTAL QUALITY
JAMES I. PALMER, JR.
EXECUTIVE DIRECTOR

October 27, 1992

True Temper Sports
8706 Deerfield Drive
Olive Branch, MS 38654

Attn: Mr. Lee McAdams

Re: Large Quantity Generator Number

This letter acknowledges receipt of your subsequent notification form as a Mississippi Large Quantity Generator.

The location identification number, MSD982095713, is assigned to:

8706 Deerfield Drive

The above location with its assigned number is now designated as a Large Quantity Generator in our files. It is suggested that you secure and become familiar with Hazardous Waste Regulations, especially the chapter dealing with Large Quantity Generators. Your identification number must be used when manifesting any hazardous waste.

It is important that this office be notified in writing within seven (7) days of ANY changes of the information submitted on your notification form.

Should you have any questions please contact this office at (601) 961-5314.

Very truly yours,

Michael J. Weaver
Hazardous Waste Division

Enclosure

FILE COPY

Please print or type with ELITE type (... characters per inch) in the unshaded areas only

Form Approved. OMB No. 2050-0028. Expires 10-31-91
GSA No. 0246-EPA-OT

Please refer to the *Instructions for Filing Notification* before completing this form. The information requested here is required by law (*Section 3010 of the Resource Conservation and Recovery Act*).

EPA Notification of Regulated Waste Activity

United States Environmental Protection Agency

Date Received (For Official Use Only)

I. Installation's EPA ID Number (Mark 'X' in the appropriate box)

[ ] A. First Notification
[X] B. Subsequent Notification (complete item C)

C. Installation's EPA ID Number: MSD982095713

II. Name of Installation (Include company and specific site name)

TRUE TEMPER SPORTS

III. Location of Installation (Physical address not P.O. Box or Route Number)

Street: 8706 DEERFIELD DRIVE

Street (continued):

City or Town: OLIVE BRANCH | State: MS | ZIP Code: 38654-

County Code: 033 | County Name: DeSoTO

IV. Installation Mailing Address (See instructions)

Street or P.O. Box: SAME

City or Town: | State: | ZIP Code: -

V. Installation Contact (Person to be contacted regarding waste activities at site)

Name (last): McADAMS | (first): LEE

Job Title: QA SUPERVISOR | Phone Number (area code and number): 601-895-4142

VI. Installation Contact Address (See instructions)

A. Contact Address: Location [X] Mailing [ ]

B. Street or P.O. Box:

City or Town: | State: | ZIP Code: -

VII. Ownership (See instructions)

A. Name of Installation's Legal Owner: T T SPORTS INC.

Street, P.O. Box, or Route Number: 871 RIDGEWAY LOOP RD #201

City or Town: MEMPHIS | State: TN | ZIP Code: 38120-4066

Phone Number (area code and number): 901-767-9411

B. Land Type: P

C. Owner Type: P

D. Change of Owner Indicator: Yes [ ] No [ ]

(Date Changed) Month / Day / Year:

EPA Form 8700-12 (01-90) Previous edition is obsolete.

Continue on reverse

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

Form Approved. OMB No. 2050-0028, Expires 10-31-91
GSA No. 0246-EPA-OT

ID – For Official Use Only

VIII. Type of Regulated Waste Activity (Mark 'X' in the appropriate boxes. Refer to instructions.)

A. Hazardous Waste Activity

1. Generator (See Instructions)
   - [X] a. Greater than 1000kg/mo (2,200 lbs.)
   - [ ] b. 100 to 1000 kg/mo (220 – 2,200 lbs.)
   - [ ] c. Less than 100 kg/mo (220 lbs.)
2. Transporter (Indicate Mode in boxes 1-5 below)
   - [ ] a. For own waste only
   - [ ] b. For commercial purposes

   Mode of Transportation
   - [ ] 1. Air
   - [ ] 2. Rail
   - [ ] 3. Highway
   - [ ] 4. Water
   - [ ] 5. Other – specify
3. [ ] Treater, Storer, Disposer (at installation) Note: A permit is required for this activity; see instructions.
4. Hazardous Waste Fuel
   - [ ] a. Generator Marketing to Burner
   - [ ] b. Other Marketers
   - [ ] c. Burner – indicate device(s) – Type of Combustion Device
     - [ ] 1. Utility Boiler
     - [ ] 2. Industrial Boiler
     - [ ] 3. Industrial Furnace
5. [ ] Underground Injection Control

B. Used Oil Fuel Activities

1. Off-Specification Used Oil Fuel
   - [ ] a. Generator Marketing to Burner
   - [ ] b. Other Markerer
   - [ ] c. Burner – indicate device(s) – Type of Combustion Device
     - [ ] 1. Utility Boiler
     - [ ] 2. Industrial Boiler
     - [ ] 3. Industrial Furnace
2. [ ] Specification Used Oil Fuel Marketer (or On-site Burner) Who First Claims the Oil Meets the Specification

IX. Description of Regulated Wastes (Use additional sheets if necessary)

A. Characteristics of Nonlisted Hazardous Wastes. Mark 'X' in the boxes corresponding to the characteristics of nonlisted hazardous wastes your installation handles. *(See 40 CFR Parts 261.20 - 261.24)*

1. Ignitable (D001)	2. Corrosive (D002)	3. Reactive (D003)	4. EP Toxic (D000)	(List specific EPA hazardous waste number(s) for the EP Toxic contaminant(s))			
[ ]	[ ]	[ ]	[X]	D001	D035		

B. Listed Hazardous Wastes. (See 40 CFR 261.31 - 33. See instructions if you need to list more than 12 waste codes.)

1	2	3	4	5	6
~~D001~~	~~D035~~	F005			
7	**8**	**9**	**10**	**11**	**12**

DL 10/22/92

C. Other Wastes. (State or other wastes requiring an I.D. number. See instructions.)

1	2	3	4	5	6

X. Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

Signature	Name and Official Title (type or print)	Date Signed
Joseph Kaferle	JOSEPH KAFERLE	10/7/92

XI. Comments

Note: Mail completed form to the appropriate EPA Regional or State Office. (See Section III of the booklet for addresses.)

OVERSIZED

DOCUMENT

LOCAL WELL NUMBER	LAND-NET LOCATION	LATITUDE (DEGREES)	LONGITUDE (DEGREES)	PRIMARY USE OF WATER	DEPTH OF WELL (FEET)	TOP OF OPEN INTERVAL (FEET)	BOTTOM OF OPEN INTERVAL (FEET)	DISCHARGE (GPM)
~~D001 OL~~IVE BRANCH	SWSWS27T01SR06W	345803	894944	U	280	240.00	--	250.00
~~D002 OL~~IVE BRANCH	SENWS34T01SR06W	345722	0894922	U	266	232.00	--	270.00
~~D003 OL~~IVE BRANCH	SWSWS27T01SR06W	345802	894942	U	390	--	--	--
~~D004~~ DESOTO WTR CO	NWSWS28T01SR06W	345821	895040	U	--	--	--	--
D005 DESOTO WTR CO	SWNWS28T01SR06W	345821	895041	P	290	255.00	--	200.00
D006 HALIBUTON CHURC	NENES21T01SR05W	345926	894335	H	160	140.00	--	10.00
D007 R OZANNE	----S21T01SR05W	345907	894421	H	--	--	--	--
D008 J E KIRK	NENES16T01SR05W	345938	894334	H	--	--	--	--
D009 NELL FREEMAN	SWSES19T01SR05W	345852	894621	H	--	--	--	--
D010 ARNOLD EPPS	SENES25T01SR05E	345800	894650	H	125	115.00	--	12.00
D011 J B BARTON	SENES25T01SR06W	345801	894651	H	230	224.00	--	10.00
D012 HOLLIDAY INN	NESES13T01SR06W	345935	894710	H	200	180.00	--	15.00
D013 C W KELLEY	NESES21T01SR06W	345900	895000	H	290	276.00	--	20.00
D015 OLIVE BRANCH	--SWS33T01SR06W	345707	0895014	P	399	349.00	--	500.00
D016 R W MARSMORE	SENES25T01SR06W	345802	894652	H	245	239.00	--	10.00
D017 AJAX CO	NWSWS26T01SR06W	345810	894835	H	220	200.00	--	10.00
D018 AJAX CO	NWSWS26T01SR06W	345811	894836	H	220	200.00	--	10.00
D019 ANDREW PAYNE	NESWS21T01SR05W	345915	894350	H	174	162.00	--	32.00
D020 SAM ODELL	NENES21T01SR05W	345935	894330	H	186	174.00	--	40.00
D021 RUFUS SCOTT	NENWS21T01SR06W	345925	895015	H	180	160.00	--	10.00
D022 MINERAL WELLS W A	NWNWS20T01SR06W	345910	895130	P	272	237.00	272.00	250.
D023 FRED DYEUS	SWNES30T01SR05W	345755	894620	H	164	156.00	--	10.00
D024 PAUL WOODS	NENWS26T01SR06W	345830	894800	H	80.0	60.00	--	10.00
D025 BILLY WOODS	NENWS26T01SR06W	345831	894801	H	82.0	62.00	--	10.00
D026 HOLIDAY IND PRK	NWSWS24T01SR06W	345904	0894742	N	343	263.00	--	1600.00
D027 OLIVER MCKINNEY	NESWS25T01SR06W	345810	894705	H	200	180.00	--	10.00
D028 P POUNDERS	NENWS32T01SR05W	345735	894500	H	160	140.00	--	15.00
D029 O C UMBERGER	NESWS21T01SR06W	345915	895015	H	232	212.00	--	10.00
D030 PATTON COOPER	SENES29T01SR05W	345805	894440	H	163	157.00	--	19.00
D031 MAUDE WHITE	NWSES26T01SR06W	345812	894829	H	217	197.00	--	10.00
D032 DESOTO WTR CO	SWNWS28T01SR06W	345815	0895040	P	220	170.00	--	300.00
D033 MINERAL WELLS W A	NENWS20T01SR06W	345920	0895134	P	275	201.00	--	286.00
						--	--	--
D034 HOLIDAY INN I P	NWSWS24T01SR06W	345901	894800	N	340	260.00	--	1700.00
D035 GOBE	----S20T01SR06W	345905	895125	H	228	224.00	--	--
~~D036 CE~~CIL STALLINGS	----S29T01SR06W	345805	895130	H	209	201.00	--	--
D037 DELMAR BALDWIN	----S30T01SR05W	345810	894605	H	194	180.00	--	--
~~D038 JOHN~~ J HUINGS	--NWS34T01SR06W	345725	894940	U	243	211.00	--	--
~~D039 ROBE~~RT B FULTON	----S29T01SR06W	345806	895131	H	210	198.00	--	18.00
D040 F DODSON	----S28T01SR05W	345805	894400	H	160	--	--	10.00

Reference 5

DATE: 09/16/94 WELLS NR. TRUE TEMPER SITE DESOTO CO. PAGE 1b

AQUIFER CODE	WATER LEVEL (FEET)	DATE WATER LEVEL MEASURED
124SPRT	--	--
124SPRT	138.00	12-24-79
--	--	--
--	--	--
124SPRT	110.00	09-01-52
124SPRT	120.00	11-01-68
--	--	--
--	--	--
--	--	--
124SPRT	100.00	05-01-69
124SPRT	105.00	07-01-69
124SPRT	115.00	11-01-69
124SPRT	120.00	09-01-69
124SPRT	156.00	12-01-69
124SPRT	105.00	11-01-69
124SPRT	115.00	02-01-70
124SPRT	135.00	02-01-70
124SPRT	110.00	04-01-69
124SPRT	105.00	05-01-69
124SPRT	125.00	10-01-70
124SPRT	90.00	09-01-65
124SPRT	100.00	03-01-71
124SPRT	50.00	03-01-71
124SPRT	50.00	04-01-71
124MUWX	139.00	12-04-79
124SPRT	120.00	05-01-71
124SPRT	80.00	09-01-71
124SPRT	130.00	10-01-71
124SPRT	120.00	12-01-71
124SPRT	130.00	10-01-71
124MUWX	124.00	12-04-79
124MUWX	109.00	11-18-80
124MUWX		
124TLLT	143.00	11-01-72
124SPRT	119.00	11-01-62
124SPRT	147.00	02-01-63
124SPRT	110.00	03-01-66
124SPRT	104.00	07-01-66
124SPRT	170.00	06-01-67
124SPRT	120.00	04-01-68

LOCAL WELL NUMBER	LAND-NET LOCATION	LATITUDE (DEGREES)	LONGITUDE (DEGREES)	PRIMARY USE OF WATER	DEPTH OF WELL (FEET)	TOP OF OPEN INTERVAL (FEET)	BOTTOM OF OPEN INTERVAL (FEET)	DISCHARGE (GPM)
D042 TOM WILLIAMS	SWSES26T01SR06W	345750	894820	H	205	185.00	--	10.00
D044 COWAN ESTATE	----S28T01SR05W	345800	894415	H	132	126.00	--	15.00
D045 BURTON DYER	NWSES30T01SR05W	345808	894627	H	244	238.00	--	10.00
D046 OLIVE BRANCH	NWSES33T01SR06W	345706	0895014	P	410	349.00	--	1250.00
D047 JESSIE MAXWELL	NWSWS33T01SR05W	345728	895048	H	145	145.00	--	10.00
~~D048 RIC~~H POUNDERS	SENWS32T01SR05W	345715	895120	H	--	--	--	--
D049 PAUL COX	NENWS26T01SR06W	345830	894910	H	--	--	--	--
D050 GERALD NICHOLS	NENES28T01SR05W	345830	895000	H	--	--	--	--
D051 FINIS DODSON JR	SWSWS28T01SR05W	345745	894429	H	--	--	--	--
D052 S ALDRIDGE	SWNWS26T01SR06W	345750	894843	-	--	--	--	--
D053 JACK BREWER	NENES32T01SR05W	345731	894443	H	--	--	--	--
D054 JOE ESTES	NESWS21T01SR06W	345900	895010	H	200	130.00	--	10.00
D055 CLYDE DAVIDSON	NESES21T01SR06W	345912	895002	H	195	175.00	--	15.00
D056 D J GILBERT	SWNES28T01SR06W	345805	894828	H	215	205.00	--	7.00
D057 OLIVE BRANCH	--NWS29T01SR06W	345835	895128	P	470	410.00	470.00	500.00
D058 OLIVE BRANCH	--NWS29T01SR06W	345834	895129	P	476	416.00	476.00	500.00
~~D059 OLIVE~~ BRANCH	--NWS27T01SR06W	345725	0894930	-	200	--	--	--
D060 R O'CONERS	----S22T01SR06W	345931	894940	H	220	200.00	--	5.00
D061 EUGENE DURAHAM	NESWS21T01SR06W	345920	895020	H	198	178.00	--	7.00
D062 JAMES WOODS	----S26T01SR06W	345750	894810	H	230	215.00	--	--
~~D063 WOO~~DVIEW EST	NWSES33T01SR05W	345713	894340	D	140	125.00	140.00	30.00
~~D064 RA~~LPH WOODS	NWSES33T01SR05W	345718	894354	P	140	123.00	140.00	30.00
D065 STANLEY LEHMAN	----S33T01SR05W	345738	0894351	R	250.	230.	250.	50.
D066 STANLEY LEHMAN	----S33T01SR05W	345738	0894351	R	250.	230.	250.	50.
D067 MINERAL WELLS W A	NENWS20T01SR06W	345917	0895140	P	250	205	250	500
~~D070 OLIVE~~ BRANCH	SWNWS29T01SR06W	345817	0895143	-	--	--	--	--
H002 HURSTS CHAPEL	--SES02T02SR06W	345610	894752	H	--	--	--	--
~~H005 T O~~ PITMAN	SWSWS03T02SR06E	345609	894948	U	--	--	--	--
H010 KING	SWSES03T01SR05W	345609	894925	H	--	--	--	--
~~H016 PAYNE~~	SWNES05T02SR06W	345620	895140	H	230	210.00	--	10.00
~~H017 GILLISP~~IE	NESWS05T02SR06W	345635	895120	H	200	--	--	10.00
~~H024 AJAX~~ CO	NENWS05T02SR06W	345645	895120	H	210	190.00	--	10.00
H026 MAXWELL	SWNES02T02SR06W	345620	894820	H	140	140.00	--	10.00
~~H028 AJAX~~ CO	NENWS05T02SR06W	345640	895105	H	230	210.00	--	10.00
H034 FAIRHAVEN W A	SWSWS01T02SR06W	345600	0894738	P	286	255.00	286.00	150.00
H043 TOM C SEAGO	----S06T03SR05W	345625	894610	H	143	--	--	--
~~H050 BOB~~ CARTER	----S04T02SR06W	345625	895025	H	200	--	--	--
~~H055 BOB~~ CARTER	----S04T02SR06W	345626	895026	H	180	166.00	--	10.00
H059 ELIZA CARROL	----S06T02SR05W	345645	894630	H	152	146.00	--	15.00
H073 FAIRHAVEN W A	SWSWS01T02SR06W	345559	894735	P	254	214.00	254.00	168.00

AQUIFER CODE	WATER LEVEL (FEET)	DATE WATER LEVEL MEASURED
124SPRT	105.00	12-01-72
124SPRT	62.00	09-01-72
124TLLT	120.00	07-01-73
124MUWX	156.00	11-18-80
124SPRT	85.00	06-01-73
--	--	--
--	--	--
--	--	--
--	--	--
--	--	--
--	--	--
124SPRT	140.00	10-01-74
124SPRT	140.00	07-01-74
124SPRT	140.00	03-01-74
124TLLT	146.00	02-01-76
124TLLT	144.00	02-01-76
124SPRT	--	--
124SPRT	145.00	01-01-75
124SPRT	150.00	02-01-75
124SPRT	.00	05-01-75
124SPRT	100.00	11-06-80
124SPRT	100.00	11-05-80
124SPRT	--	--
124SPRT	--	--
124SPRT	--	--
--	--	--
--	--	--
--	--	--
--	--	--
124SPRT	120.00	07-01-69
124SPRT	120.00	08-01-69
124SPRT	135.00	02-01-70
124SPRT	.00	05-01-70
124SPRT	120.00	07-01-70
124SPRT	135.00	12-04-79
124SPRT	119.00	10-01-60
124SPRT	120.00	08-01-67
124SPRT	100.00	12-01-67
124SPRT	110.00	10-01-72
124SPRT	135.00	12-04-79

LOCAL WELL NUMBER	LAND-NET LOCATION	LATITUDE (DEGREES)	LONGITUDE (DEGREES)	PRIMARY USE OF WATER	DEPTH OF WELL (FEET)	TOP OF OPEN INTERVAL (FEET)	BOTTOM OF OPEN INTERVAL (FEET)	DISCHARGE (GPM)
~~H082 RICHARD~~ HARRIS	SESES04T02SR05W	345604	0894328	H	100.	80.	100.	40.

AQUIFER CODE	WATER LEVEL (FEET)	DATE WATER LEVEL MEASURED
124SPRT	25.	10-07-85

AQUIFER CODE EXPLANATION

112MRVA	Mississippi River alluvial aquifer
121CRNL	Citronelle Formation
121GRMF	Graham Ferry Formation
122MOCN	Miocene Series, undifferentiated
122PCGL	Pascagoula Formation
122HBRG	Hattiesburg Formation
122CTHL	Catahoula Formation
122CTHLU	Catahoula Formation, Upper
122CTHLM	Catahoula Formation, Middle
122CTHLL	Catahoula Formation, Lower
123WSBR	Waynesboro Sand
123VKBG	Vicksburg Group
123FRHL	Forest Hill Sand
124CCKF	Cockfield Formation
124SPRT	Sparta Sand
124TLLT	Tallahatta Formation
124MUWX	Meridian-Upper Wilcox aquifer
124TSCM	Tuscahoma Formation
124WLCXM	Middle Wilcox aquifer
124WLCXL	Lower Wilcox aquifer
211RPLY	Ripley Formation
211COFF	Coffee Sand
211EUTW	Eutaw Formation
211MCSN	McShan Formation
211GORD	Gordo Formation
211MSSV	Massive Sand
300PLZC	Paleozoic rocks

A - Air conditioning
B - Bottling
C - Commercial
D - Dewater
E - Power
F - Fire
H - Domestic

I - Irrigation
J - Industrial (cooling)
K - Mining
M - Medicinal
N - Industrial
P - Public supply
Q - Aquaculture

R - Recreation
S - Stock
T - Institutional
U - Unused
Y - Desalination
Z - Other (explain in remarks)

Data Sheet Report Summary
Mississippi State Department of Health
Division of Water Supply

Covington County (Cont.)

PWS ID	Name of System	Wells	Connections	Consecutive
0160008	SOUTHSIDE WATER ASSOCIATION	0	40	Y
0160009	SOUTHWEST COVINGTON W/A	2	785	N
0160010	WILLOW GROVE WATER ASSN	2	550	N
0160011	NORTH COVINGTON W/A-SOUTH	1	629	N

** County Code: 17 DeSoto County

PWS ID	Name of System	Wells	Connections	Consecutive
0170001	BELMONT WATER ASSOCIATION	2	381	N
0170002	BRIGHT'S WATER ASSOCIATION	2	483	N
0170005	DAYS WATER ASSOCIATION	2	478	N
0170006	EUDORA WATER ASSOCIATION	2	238	N
0170007	CITY OF OLIVE BRANCH-FAIRHAVEN	2	30	N
0170009	TOWN OF HERNANDO	3	1035	N
0170010	HORN LAKE WATER ASSOCIATION	3	769	N
0170011	LEWISBURG WATER ASSOCIATION	2	625	N
0170012	NORTH MS UTILITIES-MAYWOOD	1	200	N
0170013	MINERAL WELLS	3	45	N
0170014	NESBIT WATER ASSOCIATION	2	423	N
0170015	CITY OF OLIVE BRANCH	6	724	N
0170016	PLEASANT HILL WATER ASSN	3	768	N
0170017	PLUM POINT WATER ASSOCIATION	2	468	N
0170018	SOUTHAVEN W/A	5	5723	N
0170019	WALLS WATER ASSOCIATION	1	216	N
0170020	NORTH MS UTILITIES-BUENA VISTA	2	170	N
0170021	COUNTRY MANOR MOBILE HOME PARK	1	55	N
0170022	CITY OF HORN LAKE UTILITY	3	2026	N
0170023	METRO DESOTO UTILITY COMPANY	2	32	N
0170024	DESOTO UTILITY-N HOLLY HILLS	2	213	N
0170025	DESOTO UTILITY-S TWIN LAKES	2	714	N
0170026	SKYLANE MOBILE HOME PARK	2	90	N
0170027	COUNTRY HAVEN MOBILE HOME PARK	1	103	N
0170028	NORTH MS UTILITIES-CHICK BLUFF	2	175	N
0170029	N. MS UTILITIES-LAKE O'HILLS	2	206	N
0170031	MAGNOLIA HILLS MHP	2	80	N
0170032	N MS UTILITIES-BRIDGETOWN	1	161	N
0170033	KOKO REEF WATER CO	2	50	N
0170034	HILLTOP MOBILE HOME PARK	2	138	N
0170035	SMOKEY HOLLOW WATER ASSN	2	40	N
0170043	WALLS WATER ASSN- LAKE FOREST	2	982	N
0170048	CITY OF OLIVE BRANCH-FAIRHAVEN	1	240	N

** County Code: 18 Forrest County

PWS ID	Name of System	Wells	Connections	Consecutive
0180001	BARRONTOWN W/A	3	1016	N
0180003	CARNES WATER ASSOCIATION	2	170	N
0180004	CENTRAL WATER ASSOCIATION	2	325	N
0180005	DIXIE COMMUNITY UTILITY ASSN.	3	882	N
0180006	EASTABUCHIE WATER ASSOCIATION	2	315	N
0180007	GLENDALE UTILITY DISTRICT	2	1090	N
0180008	CITY OF HATTIESBURG	10	14500	N
0180009	MCLAURIN WATER ASSOCIATION	2	165	N

Reference 6

Table 6. Household, Family, and Group Quarters Characteristics: 1990

[For definitions of terms and meanings of symbols, see text]

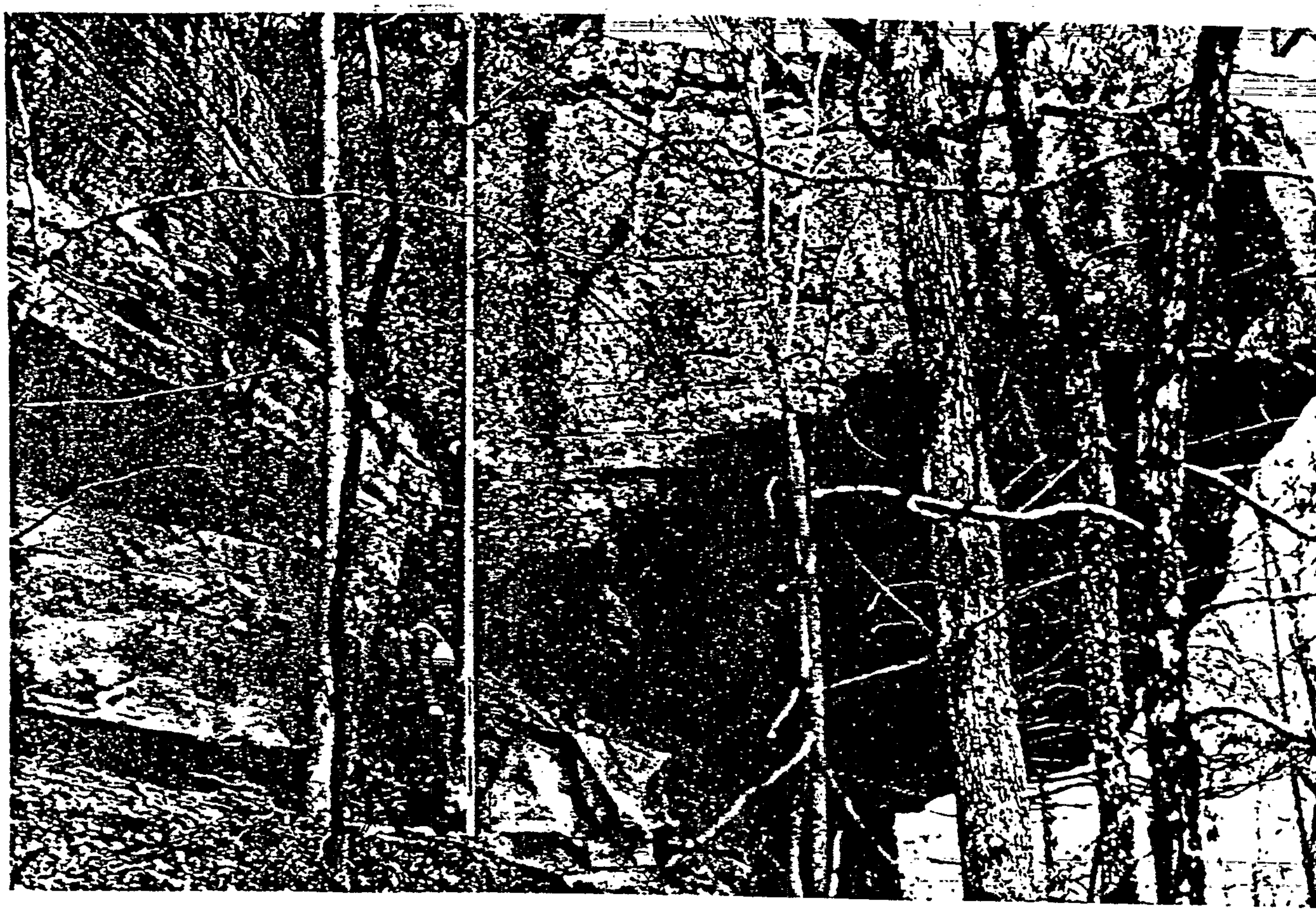
State County Place and [In Selected States] County Subdivision	Persons per—	
	Household	Family
The State	2.75	3.27
COUNTY		
Adams County	2.64	3.16
Alcorn County	2.52	3.02
Amite County	2.78	3.30
Attala County	2.63	3.20
Benton County	2.82	3.32
Bolivar County	3.02	3.64
Calhoun County	2.60	3.10
Carroll County	2.75	3.24
Chickasaw County	2.77	3.28
Choctaw County	2.76	3.26
Claiborne County	2.82	3.48
Clarke County	2.71	3.20
Clay County	2.83	3.37
Coahoma County	2.93	3.60
Copiah County	2.83	3.36
Covington County	2.84	3.36
DeSoto County	2.81	3.23
Forrest County	2.54	3.15
Franklin County	2.80	3.22
George County	2.86	3.28
Greene County	2.90	3.35
Grenada County	2.75	3.28
Hancock County	2.64	3.11
Harrison County	2.65	3.17
Hinds County	2.70	3.29
Holmes County	2.97	3.61
Humphreys County	3.07	3.67
Issaquena County	3.02	3.57
Itawamba County	2.59	3.02
Jackson County	2.82	3.25
Jasper County	2.86	3.34
Jefferson County	3.07	3.67
Jefferson Davis County	2.91	3.43
Jones County	2.69	3.17
Kemper County	2.77	3.37
Lafayette County	2.47	3.08
Lamar County	2.78	3.21
Lauderdale County	2.59	3.15
Lawrence County	2.74	3.28
Leake County	2.80	3.22
Lee County	2.65	3.14
Leflore County	2.82	3.47
Lincoln County	2.68	3.20
Lowndes County	2.71	3.23
Madison County	2.74	3.34
Marion County	2.75	3.27
Marshall County	2.93	3.41
Monroe County	2.72	3.22
Montgomery County	2.70	3.25
Neshoba County	2.77	3.22
Newton County	2.68	3.15
Noxubee County	3.04	3.65
Oktibbeha County	2.58	3.18
Panola County	2.91	3.44
Pearl River County	2.77	3.21
Perry County	2.84	3.32
Pike County	2.70	3.27
Pontotoc County	2.65	3.11
Prentiss County	2.63	3.08
Quitman County	2.95	3.58
Rankin County	2.82	3.21
Scott County	2.82	3.31
Sharkey County	3.36	3.92
Simpson County	2.78	3.28
Smith County	2.78	3.25
Stone County	2.78	3.25
Sunflower County	3.06	3.71
Tallahatchie County	3.01	3.60
Tate County	2.92	3.36
Tippah County	2.68	3.14
Tishomingo County	2.48	2.93
Tunica County	3.22	3.84
Union County	2.62	3.08
Walthall County	2.88	3.38
Warren County	2.72	3.28
Washington County	2.98	3.54
Wayne County	2.83	3.31
Webster County	2.63	3.17
Wilkinson County	2.85	3.38
Winston County	2.73	3.27
Yalobusha County	2.59	3.20
Yazoo County	2.86	3.45

U.S. Department of Commerce, Proof Copy of table generated for 1990, CPH-1: Summary population and housing characteristics, issued by Bureau of Census (April 1991). 1 page.

REFERENCE 7

TISHOMINGO COUNTY GEOLOGY AND MINERAL RESOURCES

Robert K. Merrill
Delbert E. Gann
Stephen P. Jennings



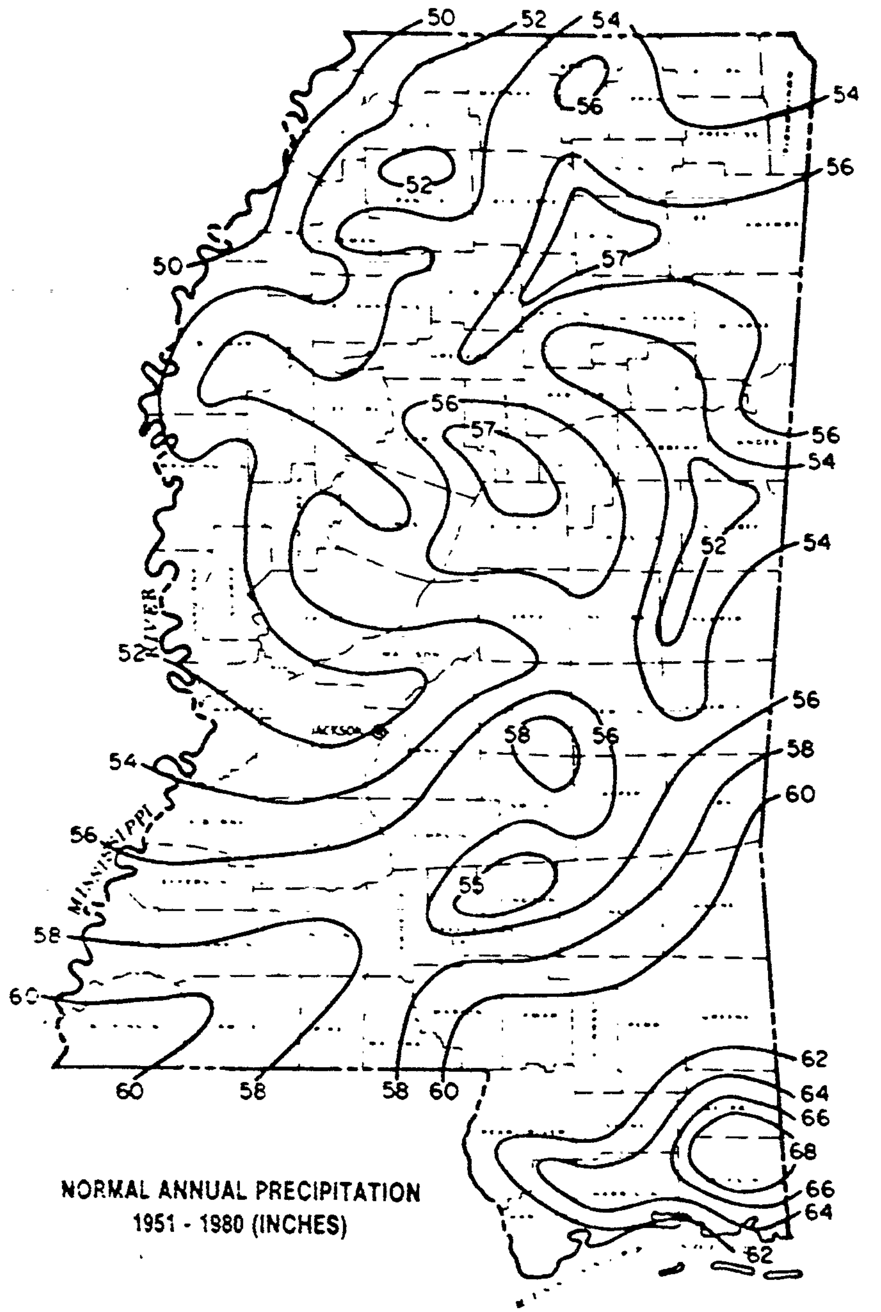
BULLETIN 127

MISSISSIPPI DEPARTMENT OF NATURAL RESOURCES
BUREAU OF GEOLOGY

CONRAD A. GAZZIER
Bureau Director

Jackson, Mississippi
1988

REFERENCE 8



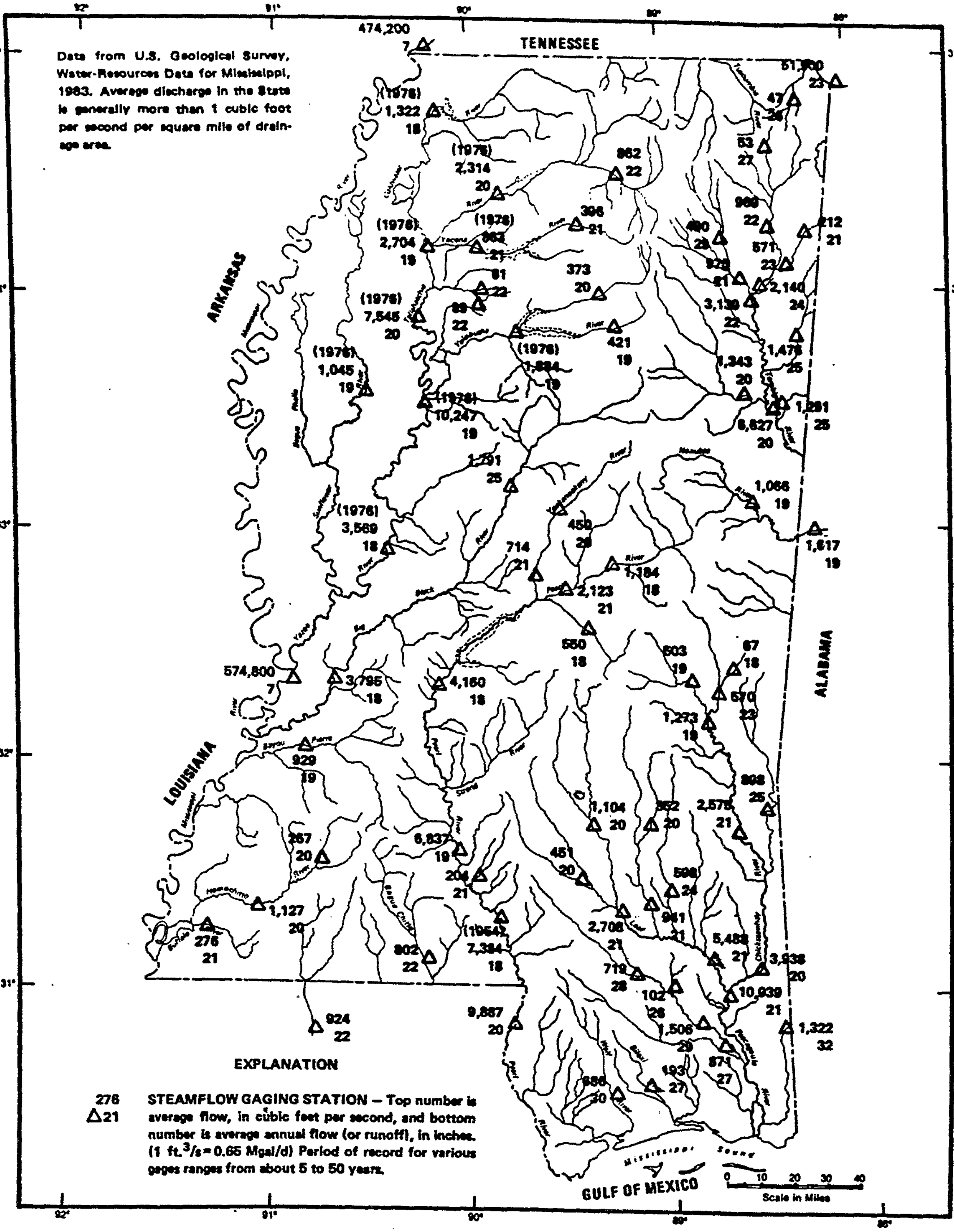
- Mean annual precipitation in inches. From U. S. Weather Bureau, Jackson, Mississippi. Based on the 30-year period 1951-1980.

SOURCES FOR WATER SUPPLIES IN MISSISSIPPI

by B. E. Wasson
Hydrologist
U.S. Geological Survey

A COOPERATIVE STUDY SPONSORED BY THE
U. S. GEOLOGICAL SURVEY
and the
Mississippi Research and Development Center
JACKSON, MISSISSIPPI
REVISED 1986

REFERENCE 9



· Average flow at selected streamgaging sites in cubic feet per second and in inches per year for periods of record through 1983 water year. (If end of record for station is earlier than 1983, the date is shown in parentheses.)

REFERENCE 10

TECHNICAL PAPER NO. 40

RAINFALL FREQUENCY ATLAS OF THE UNITED STATES

for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years

Prepared by

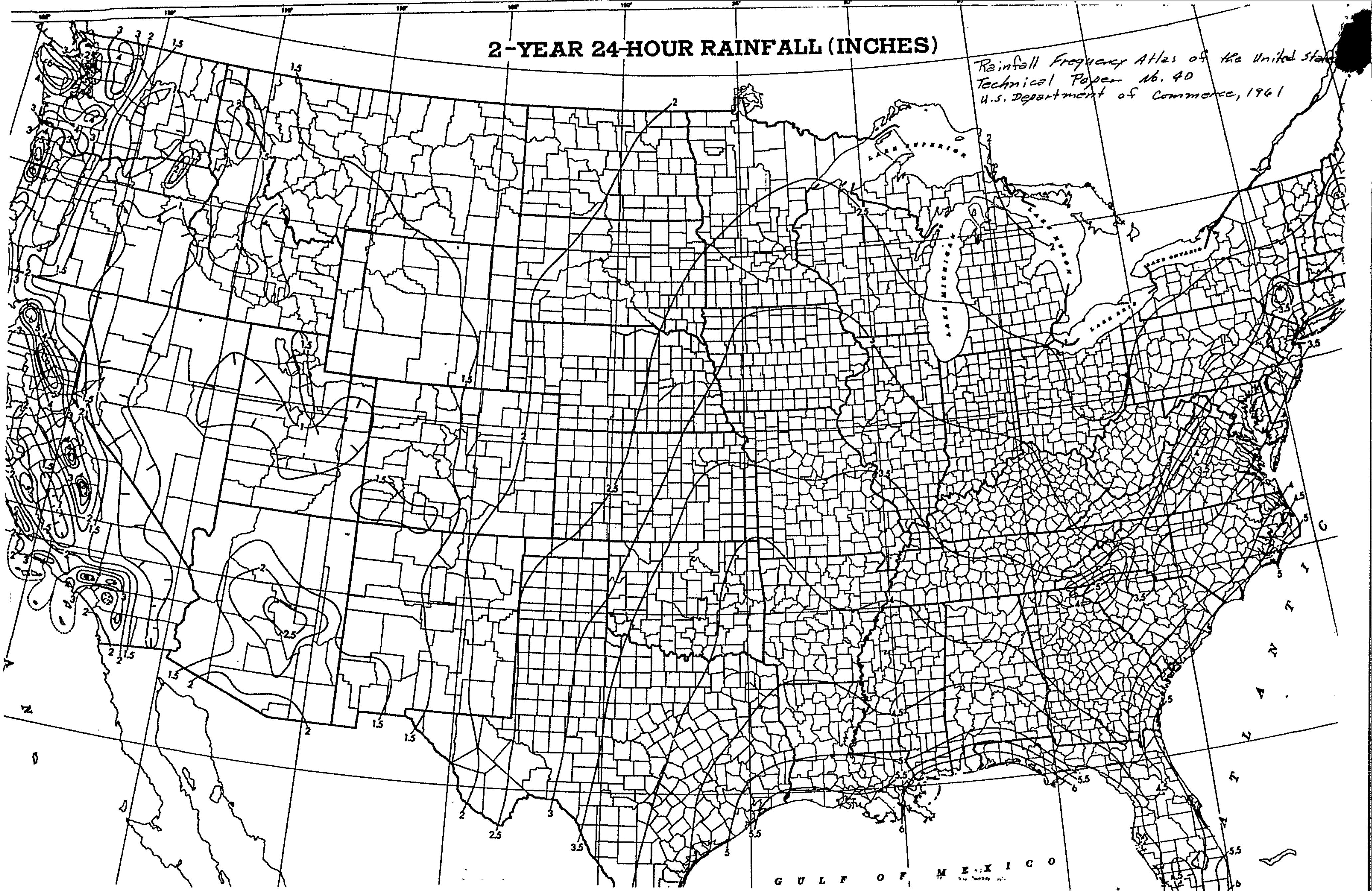
DAVID M. HERSHFIELD

Cooperative Studies Section, Hydrologic Services Division

for

Engineering Division, Soil Conservation Service

U.S. Department of Agriculture



Rainfall Frequency Atlas of the United States
Technical Paper No. 40
U.S. Department of Commerce, 1961

FLOOD HAZARD BOUNDARY MAP

DESOTO COUNTY
MISSISSIPPI
UNINC. AREAS

INDEX TO MAPS

PAGES 1 THRU 8

PAGES PRINTED: ALL PAGES

MAP INDEX

APRIL 7, 1978

COMMUNITY—PANEL NUMBER

280050 0001 - 0008

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

FEDERAL INSURANCE ADMINISTRATION

Reference 11

FLOOD HAZARD BOUNDARY MAP

DESOTO COUNTY MISSISSIPPI

UNINC. AREAS

PAGE 3 OF 8

(SEE MAP INDEX FOR PAGES NOT PRINTED)

EFFECTIVE DATE:
APRIL 7, 1978

COMMUNITY—PANEL NUMBER
280050 0003 A

U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

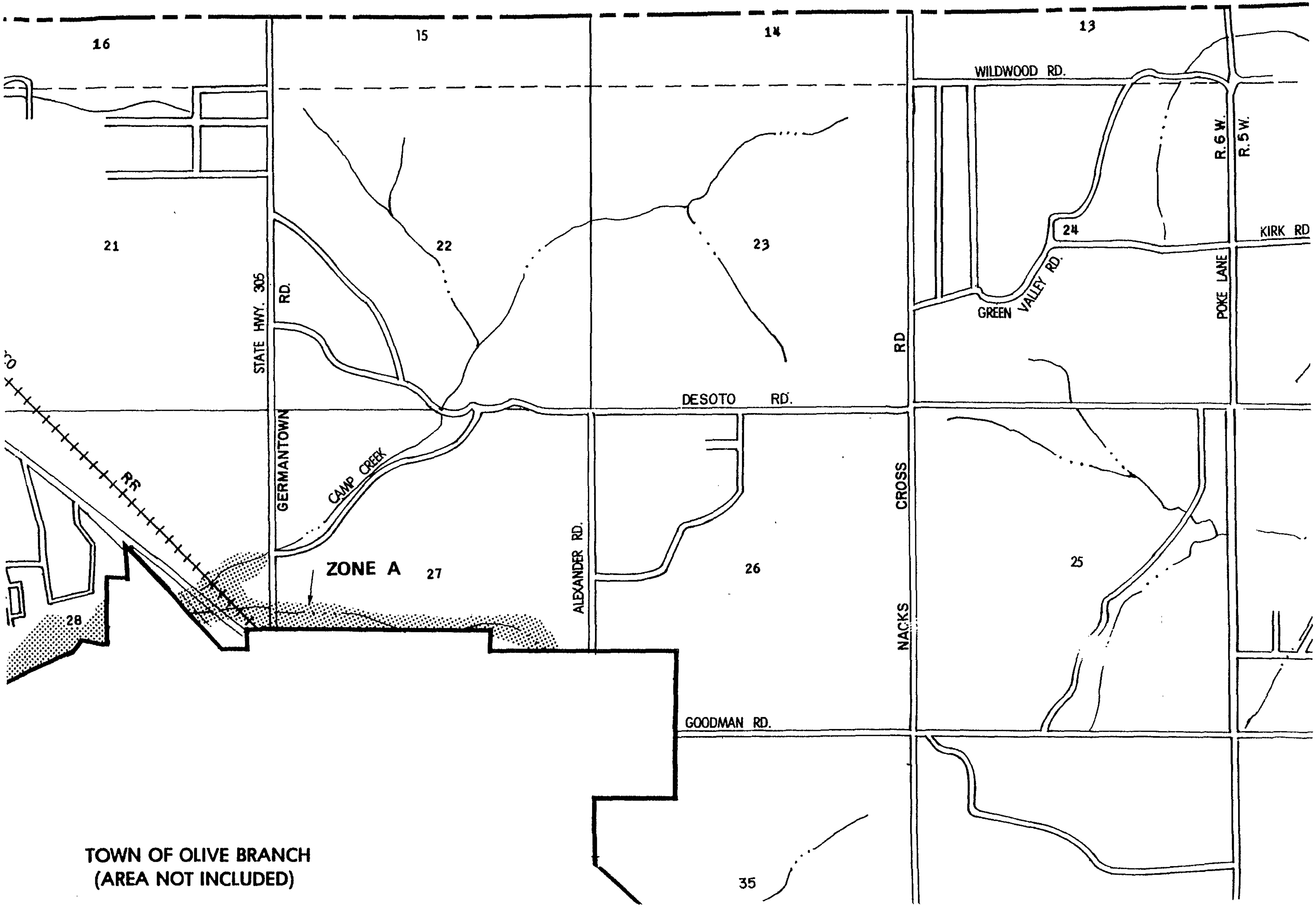
Reference 11

KEY TO SYMBOLS

SPECIAL FLOOD HAZARD AREA	ZONE A

Note: These maps may not include all Special Flood Hazard Areas in the community. After a more detailed study, the Special Flood Hazard Areas shown on these maps may be modified, and other areas added.

"CONSULT THE FEDERAL INSURANCE ADMINISTRATOR'S REGIONAL OFFICE OR CALL (800) 424-8872 (TOLL FREE) TO DETERMINE IF PROPERTIES IN THIS COMMUNITY ARE ELIGIBLE FOR FLOOD INSURANCE."


16
15
14
13
WILDWOOD RD.
R. 6 W.
R. 5 W.
21
22
23
24
KIRK RD
STATE HWY. 305
GERMANTOWN RD.
GREEN VALLEY RD.
POKE LANE
NACKS CROSS RD
DESOTO RD.
RR
CAMP CREEK
ALEXANDER RD.
ZONE A
27
26
25
28
GOODMAN RD.
35
TOWN OF OLIVE BRANCH
(AREA NOT INCLUDED)

Series 1953, No. 6

Issued September 1959

SOIL SURVEY

De Soto County Mississippi

OUR SOIL ★ OUR STRENGTH

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
MISSISSIPPI AGRICULTURAL EXPERIMENT STATION

Reference 12

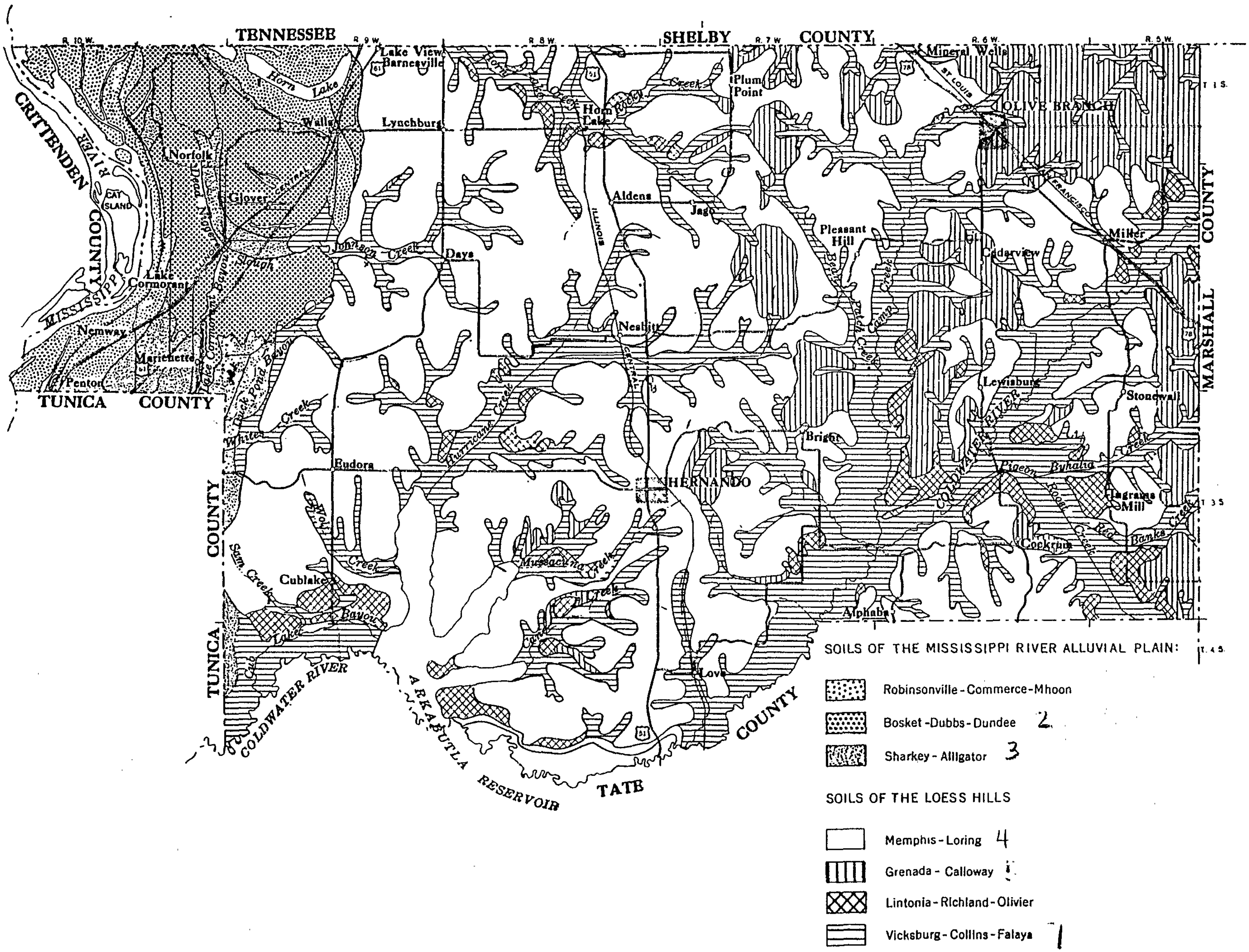


Figure 2.—**Soil associations in De Soto County.**

soils are moderately well drained to well drained and occur on very gently sloping to moderately steep ridges and slopes. The weakly developed Natchez soils are somewhat excessively drained. They occur in the western part of the association. They occupy the steeper slopes of the loess bluffs.

Included with this association are the Lexington-Loring-Providence and the Brandon-Loring complexes. They occur in the southeastern part of the county bordering some of the larger stream flood plains. Guin and Kershaw soils, developed from Coastal Plain material, occur in a few small areas in this association. Areas of local alluvium phases of soils of the bottom lands too small to show on the soil association map are also included.

Soils in this association are productive, but slopes over 5 percent are subject to severe erosion. The ridgetops and milder slopes are suited to intensive cultivation if soil and moisture conservation is practiced. The moderate slopes are suitable for pasture and perennial crops; steeper slopes are best for forestry.

GRENADA-CALLOWAY ASSOCIATION

This soil association is mainly in the northeastern part of the county, and it consists of the less well-drained soils of uplands. They have formed from deep loess and occupy mainly the very gently sloping to gently sloping low broad tops of ridges. A small part of the association consists of long narrow slopes that range from 5 to 12 percent.

The Grenada soils are moderately well drained. They are limited chiefly to the broader, more level areas in the northeastern part of the county. Some small scattered areas are in other parts of the Loess Hills. Calloway soils are somewhat poorly drained. They occur on very gently sloping to gently sloping relief in the northeastern part of the county. The Henry soils are poorly drained. They are not extensive and occur in flat or depressed positions. Henry soils and the predominant Grenada and Calloway soils have a fragipan at various depths that restricts the movement of water.

The local alluvium phases of Collins, Falaya, and Waverly soils occur in this association at the foot of slopes, in upland depressions, and along drainageways in areas that are too small to show on the soil association map.

Most of this association is subject to severe erosion, especially the soils on slopes stronger than 5 percent. A large part of the association is fairly well suited to cotton and corn. The stronger slopes are suitable for pasture or other perennial crops.

LINTONIA-RICHLAND-OLIVIER ASSOCIATION

This association is on the stream terraces that border the flood plains of larger streams in the Loess Hills. The soils have developed from silty stream alluvium when the streams flowed at a much higher level. They are known locally as bench land or second bottoms. Surface soil texture is mainly silt loam, but where most or all of the original surface soil has been removed by erosion, the surface texture is now a heavy silt loam. The relief ranges from broad nearly level and very gentle slopes to stronger slopes on escarpments that border streams or the channels of former streams.

Lintonia soils are well drained; the profile is nearly free from mottling. Richland soils are moderately well drained; the lower subsoil is mottled and there is a moderately compact fragipan at depths of 24 to 36 inches. Olivier soils are somewhat poorly drained; the sub is highly mottled and a compact fragipan begins depths of 18 to 24 inches beneath the surface. Calh soils are poorly drained and have a fragipan at depth 8 to 15 inches.

The local alluvium phases of the Collins, Falaya, Waverly series occur in this association but are of mi extent.

Soils of the association are subject to severe eros especially if slopes exceed 5 percent. The better drai soils on nearly level or gentle slopes are suitable for in sive cultivation if soil and water conservation is practi The steeper slopes are suitable for pasture and fores

VICKSBURG-COLLINS-FALAYA ASSOCIATION

This association is mainly on the bottoms or flood pl of streams in the Loess Hills. However, small areas on the eastern edge of the Mississippi River Allu Plain where the smaller streams have deposited s alluvium that washed from soils of the Loess Hills.

The surface-soil textures in this association are dominantly silt loam. In some areas the surface soil silty clay loam; in a few very small areas it is fine sa loam. The better drained, coarser textured soils usually near the channels of streams; the finer textu soils are farther from the channels in slack-water areas

The Vicksburg soils are well drained and are ne free from mottles. Collins soils are somewhat poorly moderately well drained. Mottles begin at depths of to 32 inches. Falaya soils are somewhat poorly drai and are mottled at depths beginning at 6 to 14 inc The Waverly soils are characterized primarily by t gray color and poor drainage.

Much of the area of this soil association is subject periodic flooding, but crops are seldom damaged un they are growing on the more poorly drained soils. Flo or excessive water may prevent the timely planting crops in spring. The soils of this association are am the most productive in the county for cultivated cro The better drained ones are well suited to intens cultivation of the crops commonly grown in the a The more poorly drained soils are best suited to co pasture, or forests.

Description of the Soils

In this section the soils, identified by the symbols t are on the soil map, are described in detail, and their la capability unit is given. The important characterist of the soil series of the Mississippi River Alluvial Pl are shown in table 2, and those of the soil series in Loess Hills are given in table 3. The approxim acreage and the proportionate extent of the soils map in De Soto County are shown in table 4.

Alligator clay, nearly level phase (½ to 2 percent slop (Aa).—This poorly drained soil developed from fi textured Mississippi River alluvium. It occupies slack-water areas and occurs in the southeastern part the Mississippi Alluvial Plain in close association with soils of the Sharkey and Forestdale series. Alligator c differs from Sharkey clay, mainly in being lighter color and more mottled throughout the profile, and it is usua more acid. It differs from Forestdale soils in having fi textured material throughout the profile. Runoff is sl and internal drainage is slow to very slow. When plow

Calhoun silt loam, nearly level phase (0 to 2 percent slopes) (Ca).—This soil has developed from old alluvium that was washed from loessal soils and was deposited when streams flowed at a much higher elevation than they do now. It occupies nearly level stream terraces that border the flood plains of the larger streams in the Loess Hills and is known as second-bottom or bench land. Calhoun silt loam, nearly level phase, is associated with the more sloping Calhoun silt loam, very gently sloping phase, and with better drained and less gray soils of the Olivier series. The Calhoun series is the most poorly drained member of the Lintonia-Richland-Olivier-Calhoun catena.

Native vegetation was hardwood trees, chiefly elm, post and water oak, beech, and hickory.

Profile description:

0 to 6 inches, dark grayish-brown friable silt loam; a few fine, faint grayish mottles; many small manganese concretions; strongly acid.

6 to 12 inches, light yellowish-brown, friable, light silty clay loam, faintly and finely mottled with strong brown; many manganese concretions; moderate medium to fine blocky structure; strongly acid.

12 to 48 inches, light-gray compact (fragipan) heavy silt loam; many, medium, distinct yellowish-brown mottles; a few small manganese concretions; weak medium blocky structure; strongly acid.

If this soil is cultivated, the organic matter is rapidly lost from the surface layer and it becomes lighter in color. The 6- to 12-inch layer varies from yellowish brown to gray, and the depths to the fragipan range from 8 to 15 inches.

Use and management.—Most areas of this soil have been cleared and are used for crops, some are still in hardwood forest, and a small acreage is idle. Cultivated areas are used primarily for pasture and hay; some lespedeza, sorghum, cotton, and corn are also grown. Yields are fair to poor for most crops other than pasture or hay.

Lime and fertilizers are required for high yields. Drainage ditches must be provided to remove excessive surface water. This soil is in capability unit 26.

Calhoun silt loam, very gently sloping phase (2 to 5 percent slopes) (Cb).—This soil differs from Calhoun silt loam, nearly level phase, mainly in having stronger slopes, a more variable relief, and a somewhat thinner surface layer. Because of the stronger slopes, it has better surface drainage but is more eroded than the nearly level phase. Calhoun silt loam, very gently sloping phase, is associated with Olivier soils, but it is more poorly drained.

This soil has a grayish-brown surface layer, a light yellowish-brown subsoil, and a light-gray fragipan at depths of 8 to 15 inches. Many small manganese concretions are scattered throughout the profile. Included are a few small scattered eroded areas that have surface layers 2 to 5 inches thick.

Use and management.—Most of this soil has been cleared and is used for crops; part of it is idle. Pasture plants and hay are the main crops, but some acreage is used for lespedeza, sorghum, cotton, and corn. Yields are poor for most row crops. Good management includes proper fertilizing and liming and adequate drainage to remove excess water without causing the soil to erode. This soil is in capability unit 26.

Calloway silt loam, eroded very gently sloping phase (2 to 5 percent slopes) (Cd).—This somewhat poorly drained soil has developed in deep loess. It occupies uplands and is mainly in the northeastern part of the county. This soil is associated with other phases of Calloway soils and with soils of the Grenada and Henry series. It differs from Grenada soils in containing more manganese concretions throughout the profile and from the Henry soils in color of its surface soil and in having somewhat better drainage.

From 2 to 5 inches of the original surface soil has been lost through sheet erosion, and a few small gullies or rills have formed. The soil is low in content of plant nutrients; consequently, yields of crops are also low.

Profile description:

0 to 5 inches, dark yellowish-brown friable silt loam; a few small manganese concretions; weak fine granular structure; strongly acid.

5 to 14 inches, yellowish-brown to light yellowish-brown, friable, heavy silt loam; numerous distinct mottles of dark brown; a few small manganese concretions; weak medium to fine blocky structure; strongly acid.

14 to 42 inches, light-gray compact silt loam (fragipan); many prominent, coarse, strong-brown mottles; numerous manganese concretions; massive structure; strongly acid.

42 inches +, yellowish-brown to light yellowish-brown friable silt loam; contains common, distinct, medium, dark yellowish-brown and white mottles in places; many small manganese concretions; strongly acid.

The dark-brown manganese concretions are on the surface and throughout the profile, and they are especially noticeable where the soil has been cultivated. The depths to fragipan usually range from 12 to 20 inches. In many areas the surface layer has been mixed with some of the subsoil by cultivation and is yellowish brown. Included are a few small severely eroded areas that have lost most of the original surface layer and in places part of the subsoil.

Use and management.—All of this soil has been cleared, and most is used for crops. Some of it is idle. It is used mainly for pasture and lespedeza hay; some cotton and corn are also grown. The chief management problems are control of runoff and supplying adequate amounts of lime and fertilizers. This soil is in capability unit 14.

Calloway silt loam, severely eroded gently sloping phase (5 to 8 percent slopes) (Ce).—This somewhat poorly drained soil has developed in deep loess on long narrow slopes. It differs from the eroded very gently sloping phase of Calloway silt loam in erosion and slopes. It is associated with other phases of Calloway soils, with the better drained Grenada soils, and with the more poorly drained Henry soils.

Erosion has removed most of the original surface layer and in places part of the subsoil and has exposed the yellowish-brown to light yellowish-brown subsoil. The loss of most or all of the original surface layer has reduced the water-absorption rate and water-holding capacity. Average depths to the fragipan are less on this soil than on the other Calloway soils. Many manganese concretions occur on the surface and throughout the profile of this soil.

Use and management.—All of this soil has been cleared and used for cotton, corn, and pasture; about half the acreage is now idle. Yields of crops and forage are often low. Proper management consists of controlling soil erosion and producing close-growing crops for hay, pasture, or soil improvement. Lime and fertilizers should be applied as needed. This soil is in capability unit 23.

Calloway silt loam, very gently sloping phase (2 to 5 percent slopes) (Cc).—This somewhat poorly drained soil of the uplands developed from deep loess. It differs from the eroded very gently sloping phase primarily in being areas in the eastern part of the county that have stratified layers of sand in the profile are included with this mapping unit. They are too small to be mapped separately.

Use and management.—Most of Falaya silt loam is forested. The cleared acreage is used for corn, cotton, sorghum, soybeans, hay, and pasture. The main problems are adequate drainage and protection from damaging overflow. Planting in spring may be delayed by wetness from the winter floods. Winter cover crops are difficult to grow because of the excessive wetness of the soil. Crops need moderate amounts of a complete fertilizer for good yields. This soil is in capability unit 15.

Falaya silty clay loam (½ to 2 percent slopes) (Fb).—This soil is very similar to Falaya silt loam except in texture of surface soil. The finer texture of the surface layer makes tillage somewhat more difficult than on Falaya silt loam.

Use and management.—Most of this soil is in hardwood forest. Some of the acreage has been cleared and is used for corn, cotton, soybeans, sorghum, hay, and pasture; and some is idle. Management of this soil is very similar to that of Falaya silt loam, but the moisture range for satisfactory tillage is slightly narrower. The soil is in capability unit 15.

Falaya and Waverly silt loams, local alluvium phases (½ to 2 percent slopes) (Fc).—This mapping unit consists of silty local alluvium that washed from soils developed from acid loess. The soils occupy drainageways and depressions of the uplands and the toe slopes bordering the flood plains. They are mainly in the eastern part of the county, usually in long, narrow tracts. Where both soils occur in the same area, the better drained Falaya soils occupy the outer edges and the Waverly soils occupy the center parts. Some areas do not have both soils. The soils of this mapping unit have slow to very slow runoff and internal drainage. The natural fertility is low, and fair to poor yields are to be expected.

Both Falaya and Waverly soil profiles are described elsewhere in this report.

Included with this mapping unit are a few scattered areas with slopes in the range of 2 to 5 percent. They differ from the nearly level areas mainly in having somewhat better surface drainage.

Use and management.—Most of this mapping unit is in hardwood forest. Some acreage has been cleared and is used chiefly for pasture. The soils are well suited to sorghum and lespedeza, but they are poor for cotton or corn. The low areas occupied by these soils are excellent for ditches or waterways. Fertilizer must be used to obtain fair yields of crops. The soils are in capability unit 15.

Forestdale silty clay loam, nearly level phase (½ to 2 percent slopes) (Fd).—This somewhat poorly drained to poorly drained soil has formed from alluvial sediments deposited by the Mississippi River. It occurs at the lowest elevation on the old natural levee formation in association with the better drained soils of the Beulah, Bosket, Dubbs, and Dundee series. It is also associated with the soils of the Sharkey and Alligator series, and differs from them mainly in having a somewhat lighter colored surface soil and a slightly coarser textured layer in the lower part of the profile. This soil has medium to slow runoff and slow internal drainage. The soil profile is only slightly developed.

The native vegetation consists of hardwood trees such as post, white, and red oaks, hickory, maple, blackgum, and tupelo-gum, and an undergrowth of brush, vines, and briers.

Profile description:

0 to 6 inches, pale-brown friable silty clay loam; weak crumb structure; medium to strongly acid.
6 to 30 inches, light-gray firm to friable silty clay loam, mottled distinctly with common medium areas of strong brown; weak subangular blocky structure; strongly acid.
30 to 42 inches, light-gray friable silt loam to very fine sandy loam, mottled distinctly with common medium areas of strong brown; strongly acid.

Depths to the 20- to 42-inch layer range from 24 to 36 inches. Included in this mapping unit are a few scattered areas with a silty clay surface soil texture.

Use and management.—Nearly all of Forestdale silty clay loam, nearly level phase, has been cleared, and most of it is in cultivation. Cotton is grown on about half the acreage; soybeans, corn, oats, hay, and pasture are grown on the other half. Cotton yields are fair but are poor in wet years. Yields of corn are poor, but those of oats and soybeans are usually good.

Adequate drainage of the surface is important to good soil management. The frequent use of soil-improving crops helps to maintain tilth and fertility. Most nonleguminous crops need moderate to heavy applications of nitrogen; most crops need lime. This soil is in capability unit 6.

Grenada silt loam, eroded very gently sloping phase (2 to 5 percent slopes) (Ga).—This moderately well drained soil is in the Loess Hills uplands, primarily in the northeastern part of the county. It occurs in association with other phases of the Grenada series and with soils of the Loring, Calloway, and Henry series. Grenada soils differ from the Loring soils mainly in having a paler brown subsoil. In addition, the fragipan is more compact and at less depth in the profile. Grenada soils are better drained than Calloway and Henry soils and have a darker subsoil.

This soil has a fragipan at depths ranging from 20 to 30 inches. Water moves fairly well through the subsoil but slowly through the fragipan. The moisture-holding capacity is restricted. Sheet erosion has removed from 2 to 5 inches of the original surface soil, and a few deep gullies have formed in some areas.

The native vegetation consists of hardwoods such as oaks, hickory, beech, elm, gum, walnut, and maple.

Profile description:

0 to 5 inches, dark grayish-brown, friable silt loam; weak medium to fine blocky structure; strongly acid.
5 to 9 inches, dark yellowish-brown, friable, heavy silt loam; weak medium to fine blocky structure; strongly acid.
9 to 24 inches, yellowish-brown, firm to friable, silty clay loam; medium blocky structure; strongly acid; lower few inches have many distinct strong brown mottles, a few distinct firm gray mottles, and a few manganese concretions.
24 to 42 inches, light-gray, firm, compact silty clay loam (fragipan); some medium, distinct, dark yellowish-brown mottles; few manganese concretions; strongly acid.

The surface soil varies in thickness, and the compact layer occurs at depths ranging from 20 to 30 inches in a few areas where erosion has been slight.

Use and management.—Nearly all of this soil is cleared and most of it is used mainly for pasture and lespedeza. Some corn, cotton, and oats are grown.

Winter cover crops and summer legumes improve tilth and maintain organic matter on this soil. To help prevent erosion, all cultivation should be along the contour. Close-growing crops should be used in rotation with clean cultivated crops. This soil needs complete fertilizers and lime for good crop yields. It is in capability unit 4.

Grenada silt loam, severely eroded gently sloping phase (5 to 8 percent slopes) (Gd).—This extensive soil is chiefly in the northeastern part of the county. It occurs in association with other soils of the Grenada series and with the soils of the Loring, Calloway, and Henry series. Nearly all of the original surface soil and, in places, part of the subsoil have been lost through erosion. The yellowish-brown surface soil is slightly finer textured than that of Grenada silt loam, eroded very gently sloping phase. The finer textured surface soil slows the absorption of water, and the stronger slopes increase the hazard of erosion. A few scattered moderately eroded areas are included in this unit.

Use and management.—All of Grenada silt loam, severely eroded gently sloping phase, has been cleared. It was used for clean cultivated crops at one time, but about one-fourth of the acreage is now idle. Most of the remaining acreage is used for cotton, corn, oats, hay, or pasture.

Crop rotations in which close-growing crops are grown two-thirds of the time and row crops one-third of the time help to control erosion. All cultivation should be along the contour. This soil needs lime and moderate to heavy applications of complete fertilizers for the best yields of most crops. It is in capability unit 13.

Grenada silt loam, severely eroded sloping phase (8 to 12 percent slopes) (Gf).—This soil differs from Grenada silt loam, eroded very gently sloping phase, in slopes and erosion. It also has a slightly finer textured surface soil. Most of the original surface soil and, in places, part of the subsoil have been lost through erosion. A few deep gullies not crossable by farm machinery have formed in some areas of this soil. The rapid runoff makes erosion a serious hazard.

Included in this mapping unit are one or two areas in the vicinity of Lewisburg that have slopes to nearly 17 percent.

Use and management.—All of Grenada silt loam, severely eroded sloping phase, has been cleared and used for crops. Much of it is now idle. Some cotton, corn, hay, and pasture crops are grown, but yields are generally low.

This soil should be used for hay, pasture, or pine trees. Row crops are not suggested for this soil. If grown, they should not be used more often than 1 year in 4. A balanced fertilizer and lime are needed for best production of most cultivated crops. The soil is in capability unit 22.

Grenada silt loam, severely eroded very gently sloping phase (2 to 5 percent slopes) (Gb).—This fairly extensive soil is in the northeastern part of the county. It occurs in association chiefly with other Grenada soils and with soils of the Loring, Calloway, and Henry series. Nearly all of the original surface soil and, in places, part of the subsoil have been lost through erosion. The surface soil is now a yellowish-brown, friable, heavy silt loam. Below this is the yellowish-brown heavy silt loam subsoil that has a moderate medium subangular blocky structure.

Use and management.—All of this soil has been cleared and used for cultivated crops at one time, but much of it is now idle. The areas still in cultivation are used for cotton, corn, soybeans, lespedeza, oats, and bermudagr Some vegetables and fruit are grown for home use.

Close-growing crops for hay, pasture, or soil impro ment should be grown in a long-time rotation with cle cultivated crops. Rows should be along the contour help prevent erosion and to conserve moisture. This needs balanced fertilizers and lime for best yields of m crops. It is in capability unit 13.

Grenada silt loam, sloping phase (8 to 12 percent slor (Ge).—This soil is not extensive. Most of it occurs in northeastern part of the county, but small areas are other parts of the Loess Hills. It differs from Grenada loam, eroded very gently sloping phase, primarily by h ing stronger slopes and less erosion. The surface la normally ranges from 5 to 8 inches in thickness, but a areas are included with this unit that have less thai inches of the original surface soil left. Also included a few areas on which slopes are slightly more than 12 r cent. This soil is subject to serious erosion.

Use and management.—Practically all of Grenada loam, sloping phase, is in hardwood forest from which merchantable trees have been cut. A few cleared areas used for cotton, corn, and pasture.

Perennial sod-forming plants for hay or pasture will h control erosion on this soil. Row crops should not grown more than 1 year in 4. Erosion can be control by allowing the soil to remain under a forest cover. E anced fertilizer and lime are required for best yields most crops. The soil is in capability unit 22.

Guin gravelly sandy loam, moderately steep ph (17+ percent slopes) (Gg).—This excessively drained is composed of Coastal Plain gravel, sand, and clay. Th is little or no profile development. The soil occurs r marily on some of the steeper slopes that border fl plains of the larger streams in the southeastern part of county. It is associated with the soils of the Loring se and with the Brandon-Loring and the Lexington-Lori Providence soil complexes. Guin gravelly sandy lo moderately steep phase, differs from Loring soils prima in that it has formed from Coastal Plain materials rat than from loess. It differs from the Brandon-Loring a the Lexington-Loring-Providence soils by not havin layer of loess over the Coastal Plain material.

The native vegetation consists primarily of blackja white, red, and post oaks and some elm.

Profile description:

0 to 2 inches, dark grayish-brown very friable gravelly sa loam; some dark organic stain; strongly acid; approxima 25 percent gravel.
2 to 9 inches, brown very friable gravelly sandy loam; si grain structure; very strongly acid; approximately 50 per gravel.
9 to 24 inches, red, firm gravelly sandy clay; indefinite struct very strongly acid; approximately 75 percent gravel.
24 to 53 inches, red, friable coarse sandy clay loam; very stro acid; approximately 10 percent gravel.
53 inches+ red, firm to friable gravelly coarse sandy clay; v strongly acid; approximately 50 percent gravel.

A few areas in this mapping unit are eroded more t others, and there is an occasional gully.

Use and management.—The best use for this soil is forestry or for wildlife. The soil is too steep and too lov content of plant nutrients for crop use. None of it is cultivation at the present time. This soil is in capabi unit 30.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DE SOTO COUN

SOILS LEGEND

SYMBOL	NAME
[illegible]	Alligator clay, nearly level phase
[illegible]	Alluvial soils
[illegible]	Beulah and Dundee soils, gently sloping phases
[illegible]	Bosket very fine sandy loam, nearly level phase
[illegible]	Bosket very fine sandy loam, very gently sloping phase
[illegible]	Brandon-Loring silt loams, strongly sloping phases
[illegible]	Calhoun silt loam, nearly level phase
[illegible]	Calhoun silt loam, very gently sloping phase
[illegible]	Calloway silt loam, very gently sloping phase
[illegible]	Calloway silt loam, eroded very gently sloping phase
[illegible]	Calloway silt loam, severely eroded gently sloping phase
[illegible]	Collins loamy sand, overwash phase
[illegible]	Collins silt loam
[illegible]	Collins silty clay loam
[illegible]	Collins silty clay loam, shallow phase
[illegible]	Collins and Falaya silt loams, local alluvium phases
[illegible]	Commerce silt loam, very gently sloping phase
[illegible]	Commerce silty clay loam, nearly level phase
[illegible]	Commerce very fine sandy loam, nearly level phase
[illegible]	Dowling clay
[illegible]	Dowling soils
[illegible]	Dubbs silt loam, very gently sloping phase
[illegible]	Dubbs very fine sandy loam, very gently sloping phase
[illegible]	Dubbs very fine sandy loam, gently sloping phase
[illegible]	Dundee silt loam, nearly level phase
[illegible]	Dundee silt loam, very gently sloping phase
[illegible]	Dundee silty clay loam, nearly level phase
[illegible]	Dundee silty clay loam, very gently sloping phase
[illegible]	Dundee silty clay loam, gently sloping phase
[illegible]	Dundee very fine sandy loam, nearly level phase
[illegible]	Dundee very fine sandy loam, very gently sloping phase
[illegible]	Falaya silt loam
[illegible]	Falaya silty clay loam
[illegible]	Falaya and Waverly silt loams, local alluvium phases
[illegible]	Forestdale silty clay loam, nearly level phase
[illegible]	Grenada silt loam, eroded very gently sloping phase
[illegible]	Grenada silt loam, severely eroded very gently sloping phase
[illegible]	Grenada silt loam, severely eroded gently sloping phase
[illegible]	Grenada silt loam, sloping phase
[illegible]	Grenada silt loam, severely eroded sloping phase
[illegible]	Guin gravelly sandy loam, moderately steep phase
[illegible]	Gullied land, Grenada soil material
[illegible]	Gullied land, Loring soil material
[illegible]	Henry silt loam
[illegible]	Kershaw sand, moderately steep phase

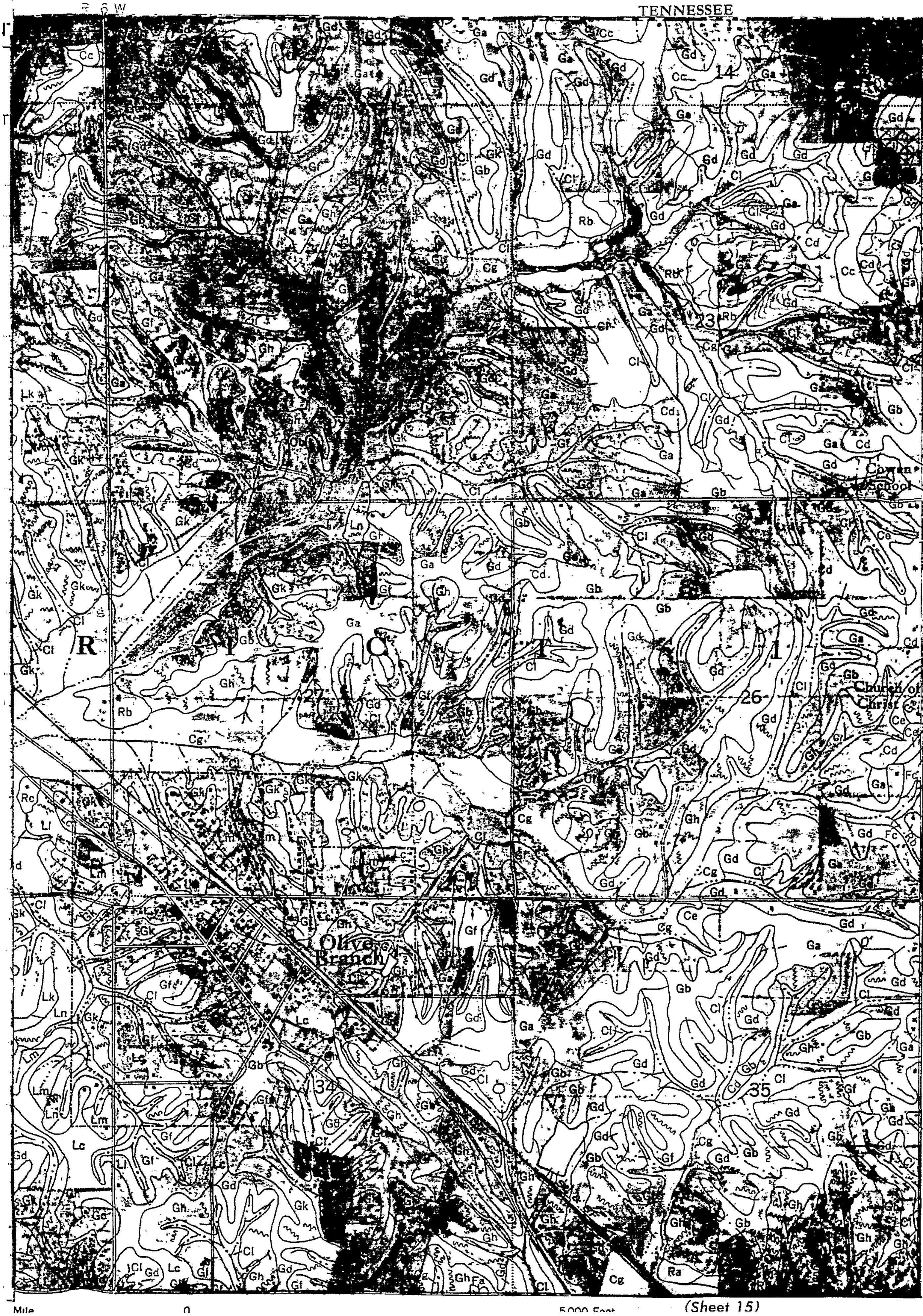
SYMBOL	NAME
[illegible]	Lexington-Loring-Providence silt loams, eroded moderately steep phases
[illegible]	Lintonia silt loam, eroded very gently sloping phase
[illegible]	Loring silt loam, eroded very gently sloping phase
[illegible]	Loring silt loam, gently sloping phase
[illegible]	Loring silt loam, sloping phase
[illegible]	Loring silt loam, strongly sloping phase
[illegible]	Loring silt loam, eroded strongly sloping phase
[illegible]	Loring silt loam, moderately steep phase
[illegible]	Loring silty clay loam, severely eroded very gently sloping phase
[illegible]	Loring silty clay loam, severely eroded gently sloping phase
[illegible]	Loring silty clay loam, severely eroded sloping phase
[illegible]	Loring silty clay loam, severely eroded strongly sloping phase
Ma	Memphis silt loam, eroded very gently sloping phase
Mb	Memphis silt loam, eroded gently sloping phase
Mc	Memphis silt loam, eroded sloping phase
Md	Memphis silt loam, eroded strongly sloping phase
Me	Memphis silt loam, eroded moderately steep phase
Mf	Memphis silty clay loam, severely eroded very gently sloping phase
Mg	Memphis silty clay loam, severely eroded gently sloping phase
Mh	Memphis silty clay loam, severely eroded sloping phase
Mk	Memphis silty clay loam, severely eroded strongly sloping phase
Ml	Memphis silty clay loam, severely eroded moderately steep phase
Mm	Mhoon silty clay, nearly level phase
Na	Natchez silt loam, steep phase
Oa	Olivier silt loam, nearly level phase
Ob	Olivier silt loam, eroded very gently sloping phase
Oc	Olivier silt loam, severely eroded gently sloping phase
Ra	Richland silt loam, very gently sloping phase
Rb	Richland silt loam, eroded very gently sloping phase
Rc	Richland silt loam, severely eroded very gently sloping phase
Rd	Richland silt loam, severely eroded gently sloping phase
Re	Richland silt loam, severely eroded sloping phase
Rf	Robinsonville very fine sandy loam, nearly level phase
Sa	Sharkey clay, nearly level phase
Sb	Sharkey clay, level phase
Sc	Sharkey very fine sandy loam, very gently sloping overwash phase
Va	Vicksburg silt loam
Vb	Vicksburg and Collins silt loams, local alluvium phases
Wa	Waverly silty clay loam

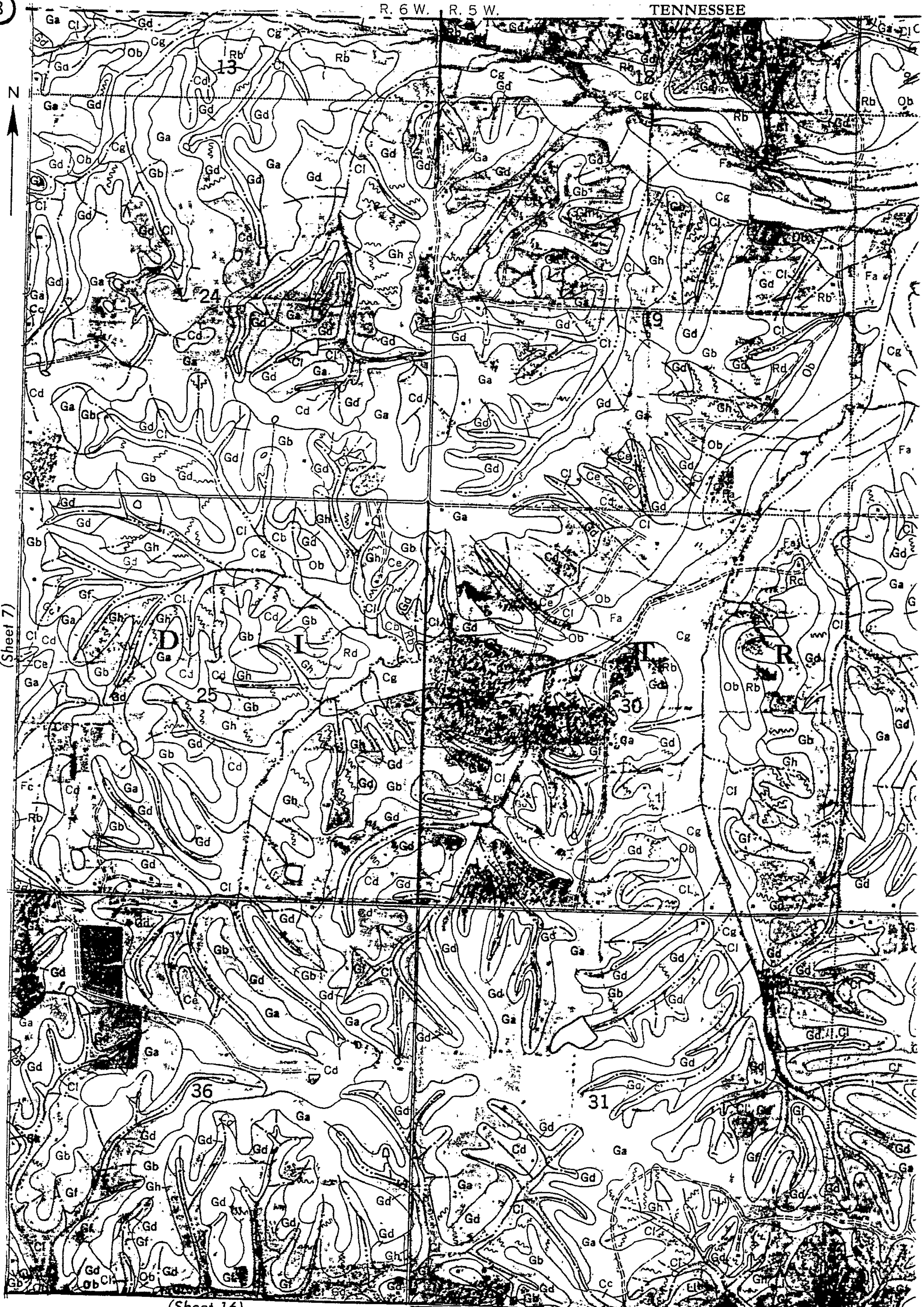
Soils surveyed 1950-1953 by E. J. McNutt, Mississippi Agricultural Experiment Station, and T. W. Green, R. B. Kahrein, H. S. Gaiberry, A. E. Thomas, M. C. Tyer, and E. D. Matthews, U. S. Department of Agriculture.
Correlation by Irving L. Martin, U. S. Department of Agriculture.

Soil map constructed 1957 by Cartographic Division, Soil Conservation Service, USDA, from 1954 aerial photographs. Controlled mosaic based on polyconic projection, 1927 North American datum.

WORKS AND S

- Roads
  - Good motor
  - Poor motor
  - Trail
- Marker, U. S.
- Railroads
  - Single track
  - Multiple track
  - Abandoned
- Bridges and crossings
  - Road
  - Trail, foot
  - Railroad
  - Ferry
  - Ford
  - Grade
  - R. R. over
  - R. R. under
  - Tunnel
- Buildings
  - School
  - Church
  - Station
- Mine and Quarry
  - Shaft
  - Dump
  - Prospect
- Pits, gravel or other
- Power line
- Pipeline
- Cemetery
- Dam
- Levee
- Tank
- Cotton gin
- Windmill
- Canal lock (point upstream)


R. 6 W.
TENNESSEE
N
14
23
26
27
34
35
R
Rb
Olive Branch
Cowan School
Church of Christ
(Sheet 8)
(Sheet 15)
Mile
0
5000 Feet


R. 6 W.
R. 5 W.
TENNESSEE
N
(Sheet 7)
(Sheet 16)
13
18
19
24
25
30
31
36
D I S T R

ENDANGERED AND THREATENED SPECIES

U.S. FISH AND WILDLIFE SERVICE

REGION 4 - ATLANTA

REFERENCE 13

Federally Listed Species by State

MISSISSIPPI

(E=Endangered; T=Threatened; CH=Critical Habitat determined)

Mammals	General Distribution
Panther, Florida (*Felis concolor coryi*) - E	Entire state
Whale, right (*Eubalaena glacialis*) - E	Coastal waters
Whale, finback (*Balaenoptera physalus*) - E	Coastal waters
Whale, humpback (*Megaptera novaeangliae*) - E	Coastal waters
Whale, sei (*Balaenoptera borealis*) - E	Coastal waters
Whale, sperm (*Physeter catodon*) - E	Coastal waters

Birds	
Crane, Mississippi sandhill (*Grus canadensis pulla*) - E,CH	Southern Jackson County
Eagle, bald (*Haliaeetus leucocephalus*) - E	Entire state
Falcon, Arctic peregrine (*Falco peregrinus tundrius*) - T	Entire state
Pelican, brown (*Pelecanus occidentalis*) - E	Coast
Plover, piping (*Charadrius melodus*) - T	Coast
Tern, least (*Sterna antillarum*); interior population - E	Mississippi River
Warbler, Bachman's (*Vermivora bachmanii*) - E	Entire state
Woodpecker, ivory-billed (*Campephilus principalis*) - E	West, South, East Central
Woodpecker, red-cockaded (*Picoides* (=*Dendrocopos*) *borealis*) - E	Entire state

Reptiles	
Alligator, American (*Alligator mississippiensis*) - T (S/A)*	South and West
Snake, eastern indigo (*Drymarchon corais couperi*) - T	South
Tortoise, gopher (*Gopherus polyphemus*) - T	Lower Gulf Coastal Plain (14 counties)
Turtle, Kemp's (Atlantic) ridley (*Lepidochelys kempii*) - E	Coastal waters
Turtle, green (*Chelonia mydas*) - T	Coastal waters

MISSISSIPPI (cont'd)

	General Distribution
Turtle, hawksbill (*Eretmochelys imbricata*) - E	Coastal waters
Turtle, loggerhead (*Caretta caretta*) - T	Coastal waters
Turtle, ringed sawback (*Graptemys oculifera*) - T	Pearl River
Fishes	
Darter, bayou (*Etheostoma rubrum*) - T	Bayou Pierre drainage
Mollusks	
Mussel, Curtus' (*Pleurobema curtum*) - E	East Fork Tombigbee River
Mussel, Judge Tait's (*Pleurobema taitianum*) - E	East Fork Tombigbee River and Buttahatchie River
Mussel, penitent (*Epioblasma* [=*Dysnomia*] *penita*) - E	East Fork Tombigbee River.
Plants	
Lindera melissifolia (Pondberry) - E	Sharkey and Sunflower Counties

*Alligators are biologically neither endangered nor threatened. For law enforcement purposes they are classified as "Threatened due to Similarity of Appearance." Alligator hunting is regulated in accordance with State law.

U.S. Fish and Wildlife Service
Vicksburg Office

SPECIES LIST BY COUNTY

E - Endangered Species
T - Threatened Species
P - Proposed Species
C - Candidate Species
CA - Conservation Agreement
CH - Critical Habitat

MISSISSIPPI

Amite	E - Red-cockaded woodpecker (Picoides borealis)
Bolivar	E - Pondberry
Claiborne	T - Bayou darter (Etheostoma rubrum)
Clark	C - Yellowblotched sawback - Graptemys flavimaculata
Copiah	T - Bayou darter (Etheostoma rubrum) T - Ringed sawback turtle (Graptemys oculifera)
Covington	T - Gopher tortoise (Gopherus polyphemus)
Forrest	E - Red-cockaded woodpecker (Picoides borealis) T - Gopher tortoise (Gopherus polyphemus) C - Yellowblotched sawback - Graptemys flavimaculata
Franklin	E - Red-cockaded woodpecker (Picoides borealis)
George	E - Red-cockaded woodpecker (Picoides borealis) T - Gopher tortoise (Gopherus polyphemus) C - Maureen's symnocthebius minute moss beetle C - Yellowblotched sawback - Graptemys flavimaculata
Greene	E - Red-cockaded woodpecker (Picoides borealis) T - Gopher tortoise (Gopherus polyphemus) C - Yellowblotched sawback - Graptemys flavimaculata
Hancock	E - Brown pelican (Pelecanus occidentalis) T - Gopher tortoise (Gopherus polyphemus)
Harrison	E - Red-cockaded woodpecker (Picoides borealis) E - Bald eagle (Haliaeetus leucocephalus) E - Eastern indigo snake (Drymarchon corais couperi) E - Brown pelican (Pelecanus occidentalis) T - Gopher tortoise (Gopherus polyphemus)
Hinds	T - Bayou darter (Etheostoma rubrum) T - Ringed sawback turtle (Graptemys oculifera)
Itawamba	E - Curtus' mussel (Pleurobema curtum) E - Penitent shell mussel (Epioblasma penita) E - Judge Tait's mussel (Pleurobema taitianum) C - Southern clubshell Pleurobema decisum
Jackson	E - Brown pelican (Pelecanus occidentalis) E - Red-cockaded woodpecker (Picoides borealis) E - Mississippi sandhill crane (CH) (Grus canadensis pulla) T - Gopher tortoise (Gopherus polyphemus) C - Yellowblotched sawback - Graptemys flavimaculata

Jasper	E - Red-cockaded woodpecker (Picoides borealis)
Jones	E - Red-cockaded woodpecker (Picoides borealis) T - Gopher tortoise (Gopherus polyphemus) C - Yellowblotched sawback - Graptemys flavimaculata
Lawrence	T - Ringed sawback turtle (Graptemys oculifera)
Lamar	T - Gopher tortoise (Gopherus polyphemus)
Leake	T - Ringed sawback turtle (Graptemys oculifera)
Lowndes	E - Judge Tait's mussel (Pleurobema taitianum) E - Penitent shell mussel (Pleurobema penita)
Madison	T - Ringed sawback turtle (Graptemys oculifera)
Marion	T - Ringed sawback turtle (Graptemys oculifera) T - Gopher tortoise (Gopherus polyphemus)
Monroe	E - Curtus' mussel (Pleurobema curtum) E - Penitent shell mussel (Epioblasma penita) E - Judge Tait's mussel (Pleurobema taitianum) C - Southern clubshell Pleurobema decisum
Neshoba	T - Ringed sawback turtle (Graptemys oculifera)
Noxubee	E - Red-cockaded woodpecker (Picoides borealis)
Oktibbeha	E - Red-cockaded woodpecker (Picoides borealis)
Pearl River	T - Ringed sawback turtle (Graptemys oculifera) T - Gopher tortoise (Gopherus polyphemus)
Perry	E - Red-cockaded woodpecker (Picoides borealis) T - Gopher tortoise (Gopherus polyphemus) C - Yellowblotched sawback - Graptemys flavimaculata
Rankin	T - Ringed sawback turtle (Graptemys oculifera)
Scott	E - Red-cockaded woodpecker (Picoides borealis) T - Ringed sawback turtle (Graptemys oculifera)
Simpson	T - Ringed sawback turtle (Graptemys oculifera)
Smith	E - Red-cockaded woodpecker (Picoides borealis)
Stone	E - Red-cockaded woodpecker (Picoides borealis) E - Eastern indigo snake (Drymarchon corais couperi) T - Gopher tortoise (Gopherus polyphemus)
Sharkey	E - Pondberry (Lindera melissifolia)
Sunflower	E - Pondberry (Lindera melissifolia)

Wayne	E - Red-cockaded woodpecker (*Picoides borealis*) T - Gopher tortoise (*Gopherus polyphemus*) C - Yellowblotched sawback - *Graptemys flavimaculata*
Wilkinson	E - Red-cockaded woodpecker (*Picoides borealis*)
Winston	E - Red-cockaded woodpecker (*Picoides borealis*)

Endangered Species OF MISSISSIPPI

MUSSELS

Species	Federal Status
Alabama Moccasinshell (*Medionidus acutissimus*)	Threatened (Proposed)
Black clubshell (*Pleurobema curtum*)	Endangered
Inflated Heelsplitter (*Potamilus inflatus*)	Threatened
Orange-nacre Mucket (*Lampsilis perovalis*)	Threatened (Proposed)
Ovate Clubshell (*Pleurobema perovatum*)	Endangered (Proposed)
Southern Clubshell (*Pleurobema decisum*)	Endangered (Proposed)
Southern Combshell (*Epioblasma penita*)	Endangered
Southern Pink Pigtoe (*Pleurobema taitianum*)	Endangered
Southern Round Pigtoe (*Pleurobema marshalli*)	Endangered
Stirrupshell (*Quadrula stapes*)	Endangered

INSECT

American Burying Beetle (*Nicrophorus americanus*)	Endangered

FISH

Southern Redbelly Dace[1] (*Phoxinus erythrogaster*)	None
Bayou Darter (*Etheostoma rubrum*)	Threatened
Crystal Darter (*Crystallaria asprella*)	Candidate, Category 2
Frecklebelly Madtom (*Noturus munitus*)	Candidate, Category 2
Alabama Sturgeon (*Scaphirhynchus suttkusi*)	Candidate, Category 1
Gulf Sturgeon (*Acipenser oxyrhynchus desotoi*)	Threatened
Pallid Sturgeon (*Scaphirhynchus albus*)	Endangered

AMPHIBIANS

Dusky Gopher Frog (*Rana capito sevosa*)	Candidate, Category 1
Cave Salamander (*Eurycea lucifuga*)	None
Green Salamander (*Aneides aeneus*)	Candidate Category 2
Spring Salamander (*Gyrinophilus porphyriticus*)	None

REPTILES

Black Pine Snake (*Pituophis melanoleucus lodingi*)	Candidate Category 2
Eastern Indigo Snake (*Drymarchon corais couperi*)	Threatened
Rainbow Snake (*Farancia erytrogramma*)	None
Southern Hognose Snake (*Heterodon simus*)	None
An Undescribed Redbelly Turtle (*Pseudemys sp.*)	None
Black-knobbed Sawback (*Graptemys nigrinoda*)	None
Ringed Sawback (*Graptemys oculifera*)	Threatened
Yellow-blotched Sawback (*Graptemys flavimaculata*)	Threatened
Gopher Tortoise (*Gopherus polyphemus*)	Threatened
Atlantic Ridley (*Lepidochelys kempi*)	Endangered
Green Turtle (*Chelonia mydas*)	Threatened
Hawksbill Turtle (*Eretmochelys imbricata*)	Endangered
Loggerhead Turtle (*Caretta caretta*)	Threatened
Leatherback Turtle (*Dermochelys coriacea*)	Endangered

Reference 14

BIRDS

Mississippi Sandhill Crane (*Grus canadensis pulla*) .... Endangered
Bald Eagle (*Haliaeetus leucocephalus*) .... Endangered
Peregrine Falcon (*Falco peregrinus*) .... Endangered
Brown Pelican (*Pelecanus occidentalis*) .... Endangered
Piping Plover (*Charadrius melodus*) .... Threatened
Snowy Plover (*Charadrius alexandrinus*) .... Candidate, Category 2
Wood Stork (*Mycteria americana*) .... None
Least Tern[2] (*Sterna antillarum*) .... Endangered
Bachman's Warbler (*Vermivora bachmanii*) .... Endangered
Ivory-billed woodpecker (*Campephilus principalis*) .... Endangered
Red-cockaded Woodpecker (*Picoides borealis*) .... Endangered
Bewick's Wren (*Thryomanes bewickii*) .... None

MAMMALS

Gray Bat (*Myotis grisescens*) .... Endangered
Indiana Bat (*Myotis sodalis*) .... Endangered
Black Bear (*Ursus americanus*) .... Threatened
West Indian Manatee (*Trichechus manatus*) .... Endangered
Florida Panther (*Felis concolor coryi*) .... Endangered
Whales, Order Cetacea, excluding Family Delphinidae

PLANT

Pondberry Spicebush (*Lindera melissifolia*)
Price's Potato Bean (*Apios priceana*)

[1]West Mississippi disjunct population
[2]Interior population nesting along the Mississippi River

Endangered Species of Mississippi
Miss. Department of Wildlife, Fisheries & Parks
Museum of Natural Science
111 North Jefferson Street
Jackson, MS 39201
(601) 354-7303

Funded in part by:
US Fish and Wildlife Service

EPA in cooperation with Mississippi Department of Agriculture and Commerce, Bureau of Plant Industry

Printed on Recycled Paper
1992

U.S. DEPARTMENT OF COMMERCE
FREDERICK H. MUELLER, *Secretary*

WEATHER BUREAU
F. W. REICHELDERFER, *Chief*

TECHNICAL PAPER NO. 37

Evaporation Maps for the United States

M. A. KOHLER, T. J. NORDENSON, and D. R. BAKER
Hydrologic Services Division

WASHINGTON, D.C.
1959

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. - Price 65 cents

REFERENCE 15

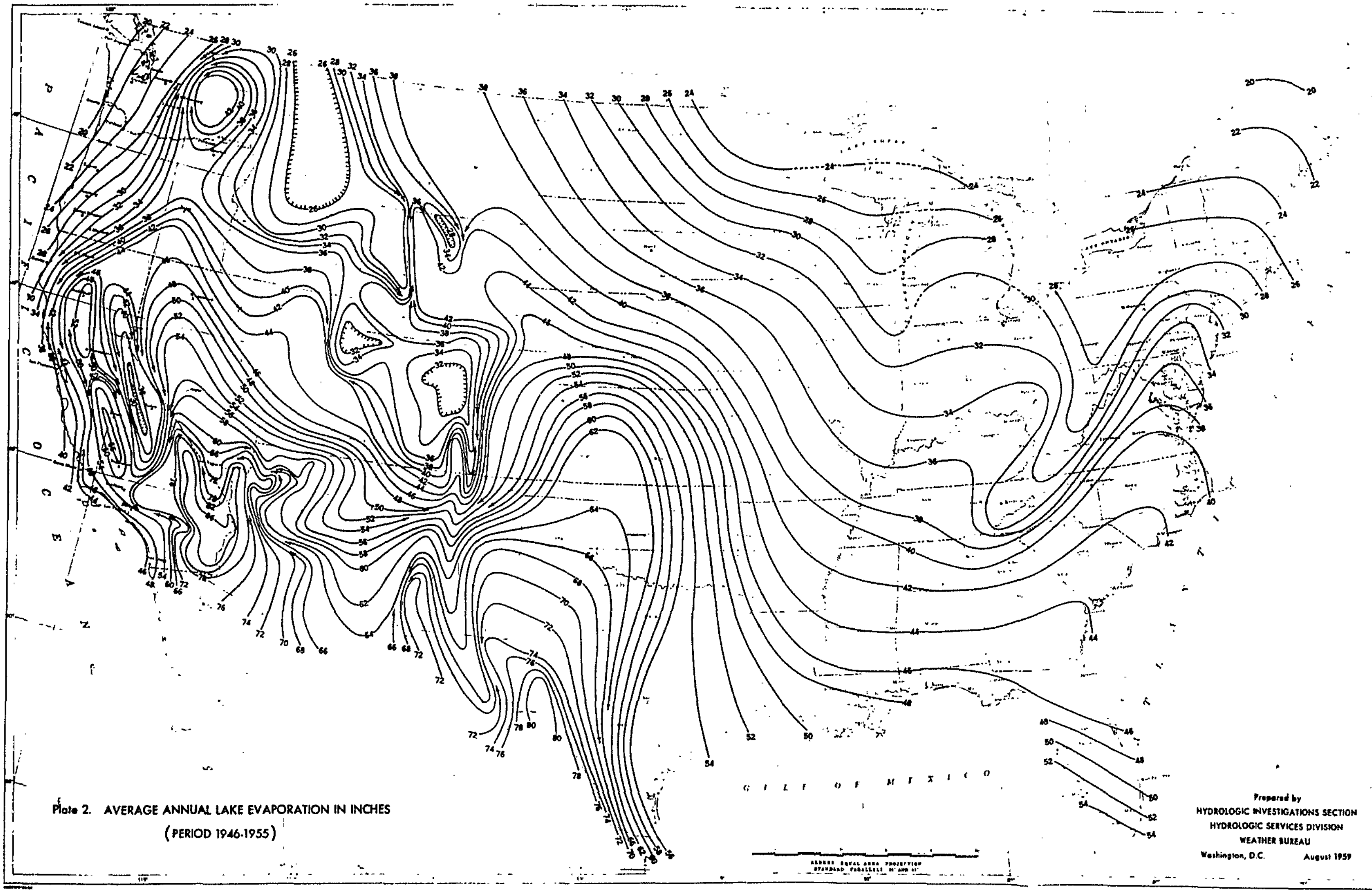


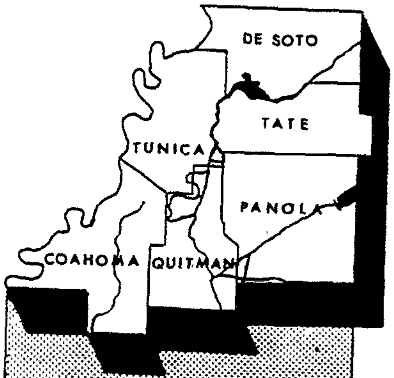
Plate 2. AVERAGE ANNUAL LAKE EVAPORATION IN INCHES

(PERIOD 1946-1955)

Prepared by
HYDROLOGIC INVESTIGATIONS SECTION
HYDROLOGIC SERVICES DIVISION
WEATHER BUREAU
Washington, D.C. August 1959

Plate 2.

525189 O-59 (Face Blank p. 14) No. 2



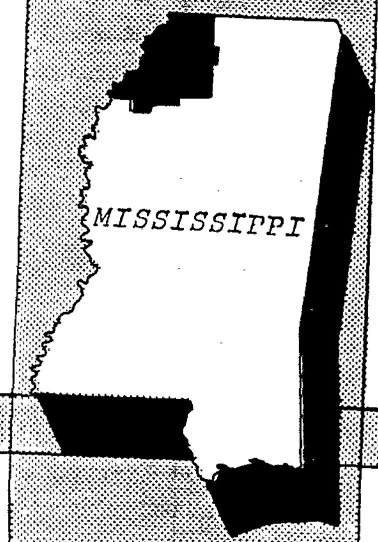
WATER FOR INDUSTRIAL AND AGRICULTURAL DEVELOPMENT

IN

Coahoma, De Soto, Panola, Quitman, Tate, and Tunica Counties, Mississippi

By

G. J. Dalsin and J. M. Bettandorff



A Cooperative Study Sponsored by the

U. S. GEOLOGICAL SURVEY

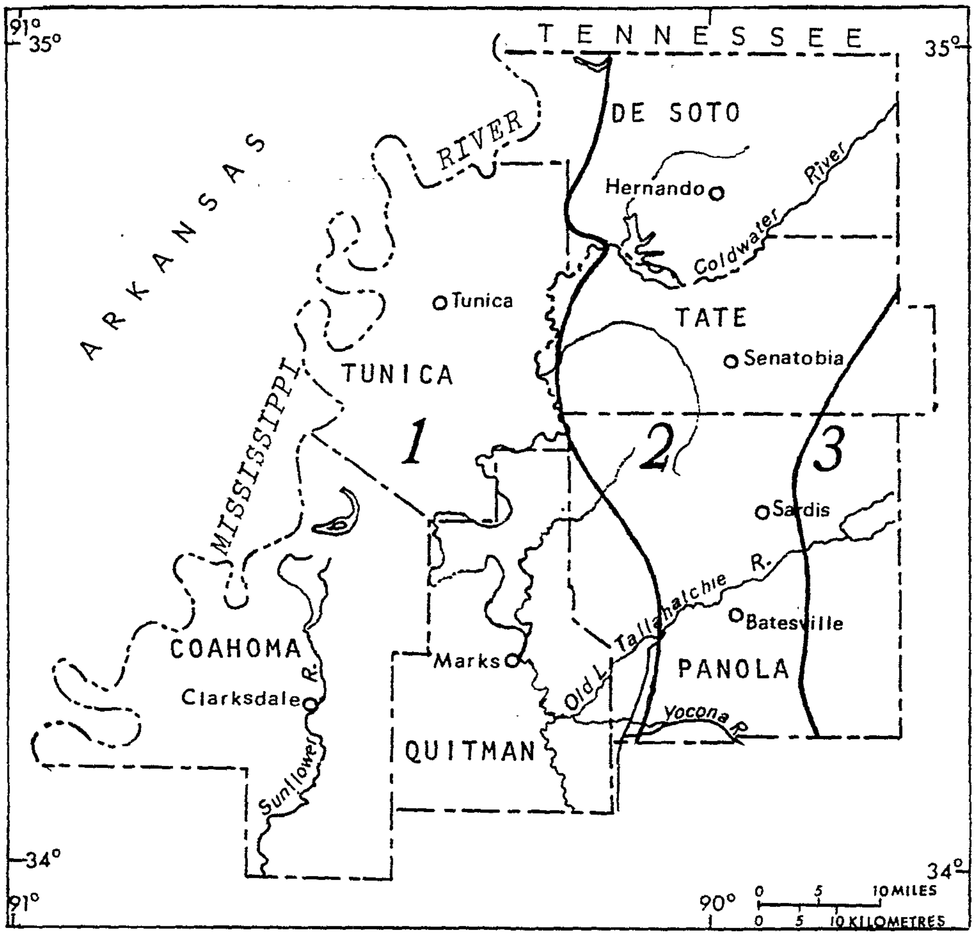
and the

MISSISSIPPI RESEARCH AND DEVELOPMENT CENTER

1976

Published by the
Mississippi Research and Development Center

Reference 18



EXPLANATION

1. Mississippi Alluvial Plain
2. Loess Hills
3. North - Central Hills

Figure 2.--Physiographic districts.

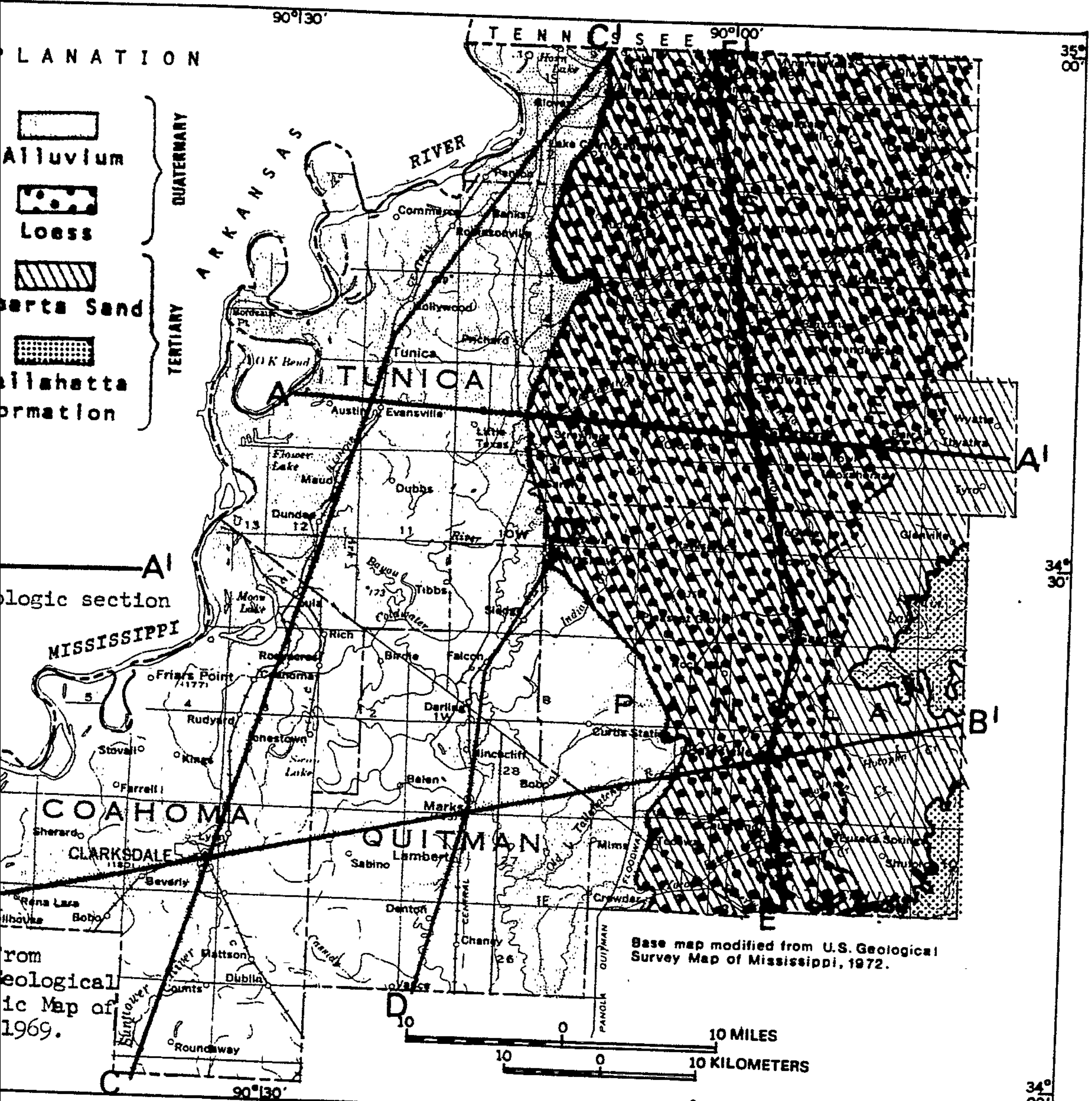


Figure 5.--Areal geology and location of geohydrologic sections.

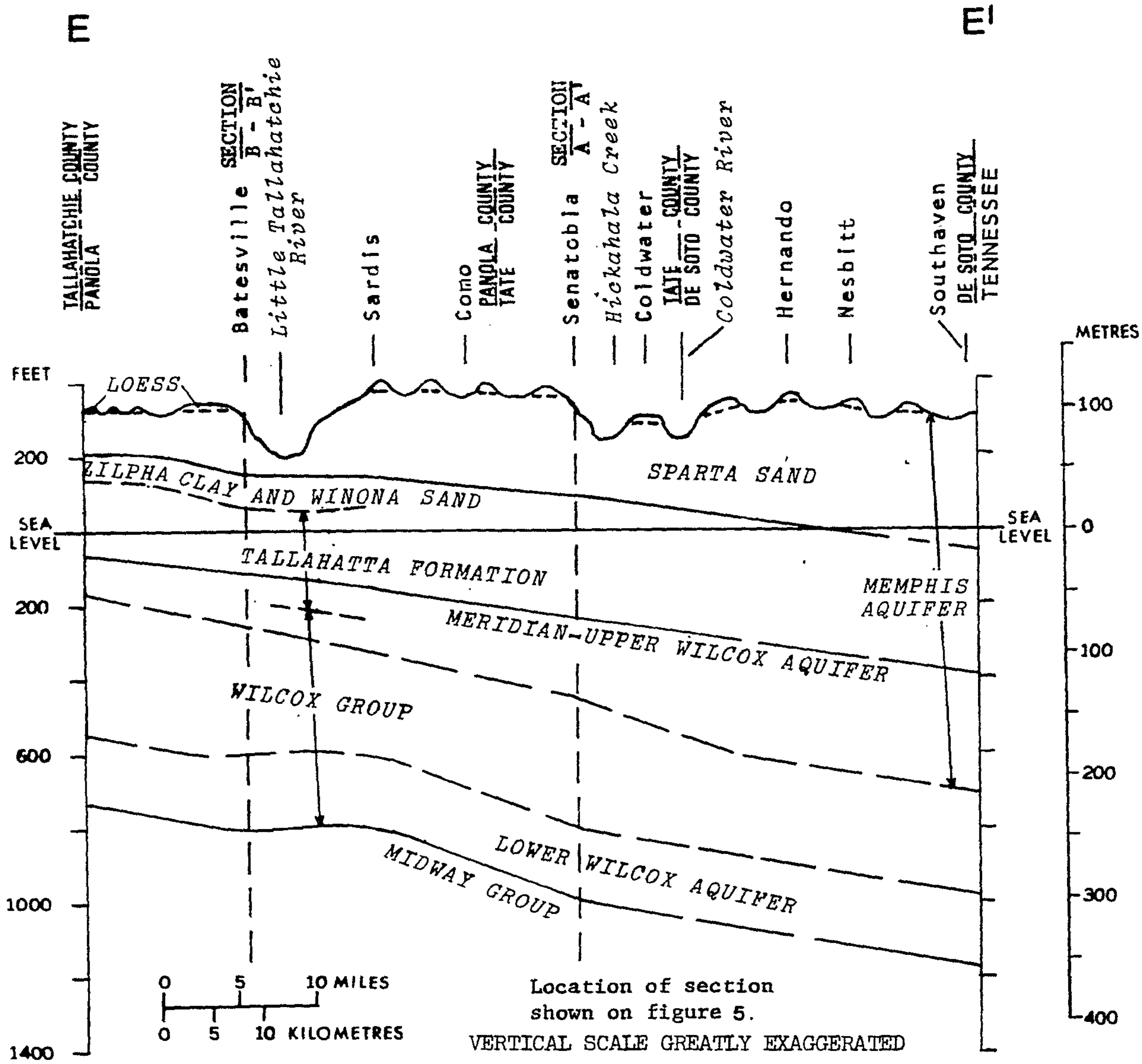


Figure 10.--Geohydrologic section across Panola, Tate, and De Soto Counties.

Table 1. -- Stratigraphic units and their water-bearing character

Era- them	System	Series	Group	Stratigraphic unit	Thickness (ft)	Water-bearing character
	Quaternary	Holocene and Pleistocene		Flood-plain deposits (other than Mississippi River alluvium)	0-60	Small water supplies available from shallow wells.
				Mississippi River alluvium	0-200	Water is hard and contains iron. The principal source of water for irrigation and cooling. Yields up to 5,000 gal/min to irrigation wells.
				Loess	0-30	Not an aquifer.
				Terrace deposits	0-120	Wells with yields up to 100 gal/min could be developed in some places where these deposits are present.
	Tertiary	Eocene	Claiborne	Cook Mountain Formation	0-200	Not an aquifer.
				Sparta Sand	0-800	A principal aquifer in Coahoma, De Soto, Panola, and Tate Counties. Yields up to 3,000 gal/min to industrial wells. Potential aquifer in Quitman and Tunica Counties. Iron and pH are problems locally.
				Zilpha Clay	0-120	Not an aquifer.
				Winona Sand	0-40	Not a major aquifer in study area.
				Tallahatta Formation	150-500	Not generally used in study area. A potential aquifer in parts of Quitman, Tate, and Tunica Counties. Source of water for wells in eastern part of Panola County.
				Meridian Sand Member		50-350 feet thick. A principal aquifer in Coahoma and Quitman Counties. Potential source of water in Panola, Tate, and Tunica Counties. Iron and low pH are problems locally.
			Wilcox	upper part	450-950	
		Paleocene		middle part		Minor aquifers in the middle part of the Wilcox are local sources of water in Panola County and potential major sources in Quitman County.
				lower part		50-360 feet thick. A principal aquifer in Panola, Quitman, Tate, and Tunica Counties; important in Coahoma and De Soto Counties.
			Midway	Undifferentiated	550-900	No aquifers.
	Cretaceous	Upper Cretaceous	Selma	Ripley Formation and Coffee Sand, undivided	900-1,200	No wells. These formations are the only Cretaceous aquifers that contain fresh water in eastern De Soto and northeastern Tate Counties. Saline in Coahoma, Panola, Quitman, Tunica, and most of Tate and western De Soto Counties.
				Undifferentiated		Not known to contain aquifers in study area.

of the stream system.

The length of the study reach on the Big Sunflower River, extending from gaging station 7-2880 at Clarksdale in Coahoma County to gaging station 7-2882 near Lombardy in Sunflower County, is approximately 38 mi (61 km). Tributaries of the Big Sunflower River included in the study were Harris Bayou near Counts, station 7-2880.7, Hushpuckena River near Baltzer, station 7-2881.7, and Black Bayou at Baltzer, station 7-2881.85.

The water-quality parameters determined at regular intervals were specific conductance, pH, temperature, and dissolved oxygen (DO). Composite samples were collected during a 24-hour period at each site and were analyzed for nutrient content (table 12). Water-quality parameters were determined at 1-hour intervals for 72 hours at the Big Sunflower River near Hopson, station 7-2880.1, and at the Big Sunflower River near Roundaway, station 7-2880.95, and at 3-hour intervals for the remaining nine stations. At least one discharge measurement was made at each station during the study.

The pH values for the Big Sunflower River stations, Harris Bayou, and Hushpuckena River ranged from 7.2 to 7.6. The pH of Black Bayou ranged from 8.0 to 8.7. High pH values for Black Bayou are probably due to point sources of pollution. Agricultural practices in the area may also be contributing to the high pH of Black Bayou.

DO concentrations ranged from 2.1 to 17.0 mg/l in the study (fig. 14). They were 2.1 to 6.5 mg/l for the Big Sunflower River stations, 4.3 to 6.1 mg/l for Harris Bayou and Hushpuckena River, and 4.7 to 17.0 mg/l for Black Bayou. The wide range in DO concentration in Black Bayou was due to the high algal concentration in the stream. From the DO profiles it can be seen that DO increases during the daylight hours, owing to photosynthesis, and decreases during the night.

Water temperature for all stations in the study ranged from 25.5 to 29.5°C, or 78 to 85°F (fig. 15). The mean diurnal temperature fluctuation was 1.7°C, or 3°F. The maximum diurnal temperature change was 2.8°C, or 5°F and occurred at the Big Sunflower River, station 7-2880.1, at Hopson. Reflecting diurnal air temperatures, temperatures of streams during the study started increasing between 9 a.m. and 1 p.m., reached a maximum around 6 p.m., and decreased until midmorning. Owing to the heat-storage capacity of water, stream-temperature changes lag behind the air-temperature changes.

GROUND-WATER RESOURCES

The Fresh-Water Section

The fresh-water section thickens from 800 ft (240 m) to 3,000 ft (910 m) from east to west in the study area. The Coffee Sand and the Ripley Formation contain fresh water (less than 1,000 milligrams of dissolved solids per litre of water) in eastern De Soto and Tate Counties, as indicated by wells and electric logs in adjacent Marshall County (east of the report area). Two abrupt changes in the base of fresh water occur in eastern De Soto and Tate Counties, (fig. 16), one where the base changes from the Coffee Sand to the Ripley Formation and the other where the base changes from the Ripley Formation to the lower Wilcox aquifer. Another abrupt change occurs in Coahoma and Quitman Counties, where the base of fresh water changes from the lower Wilcox aquifer to the Meridian-upper Wilcox aquifer. In extreme western Coahoma County, still another abrupt change moves the base of fresh water from the Meridian-upper Wilcox aquifer to the Sparta Sand. The base of the fresh-water section is mostly in the lower Wilcox aquifer in the study area. Dissolved solids exceed 500 mg/l everywhere in the Coffee Sand and Ripley Formation, and in some areas near the downdip extent of fresh water in the lower Wilcox and Meridian-upper Wilcox aquifers. Water below the fresh-water section is saline.

Two or more fresh-water aquifers are available for water-supply development everywhere in the six counties, and in some areas there are as many as five aquifers. Tertiary aquifers supply water to most wells in the study area. The Mississippi River valley alluvial aquifer, which is a Quaternary aquifer, supplies most irrigation wells.

The principal aquifers are the lower Wilcox, Meridian-upper Wilcox, Sparta Sand, and Mississippi River valley alluvium. Aquifers of less importance are the Coffee Sand, Ripley Formation, minor aquifers of the Wilcox Group, terrace deposits, and flood-plain deposits other than Mississippi River alluvium.

Electric logs of oil-test and water wells (fig. 17) constitute one of the best sources of information on the distribution and thickness of water-bearing sand beds. Sand intervals indicated by electric logs are listed in the appendix.

Principal Aquifers

Lower Wilcox Aquifer

Deepest among the principal aquifers underlying the six-county study area is the lower Wilcox aquifer at the base of the Wilcox Group. This unit contains fresh water throughout the area, except in southern Coahoma and southwestern Quitman Counties (fig. 18). The base of the aquifer is 500 to 2,100 ft (150 to 640 m) below sea level in the area where it contains fresh water and dips to about 2,400 ft (730 m) below sea level at the west edge of Coahoma County.

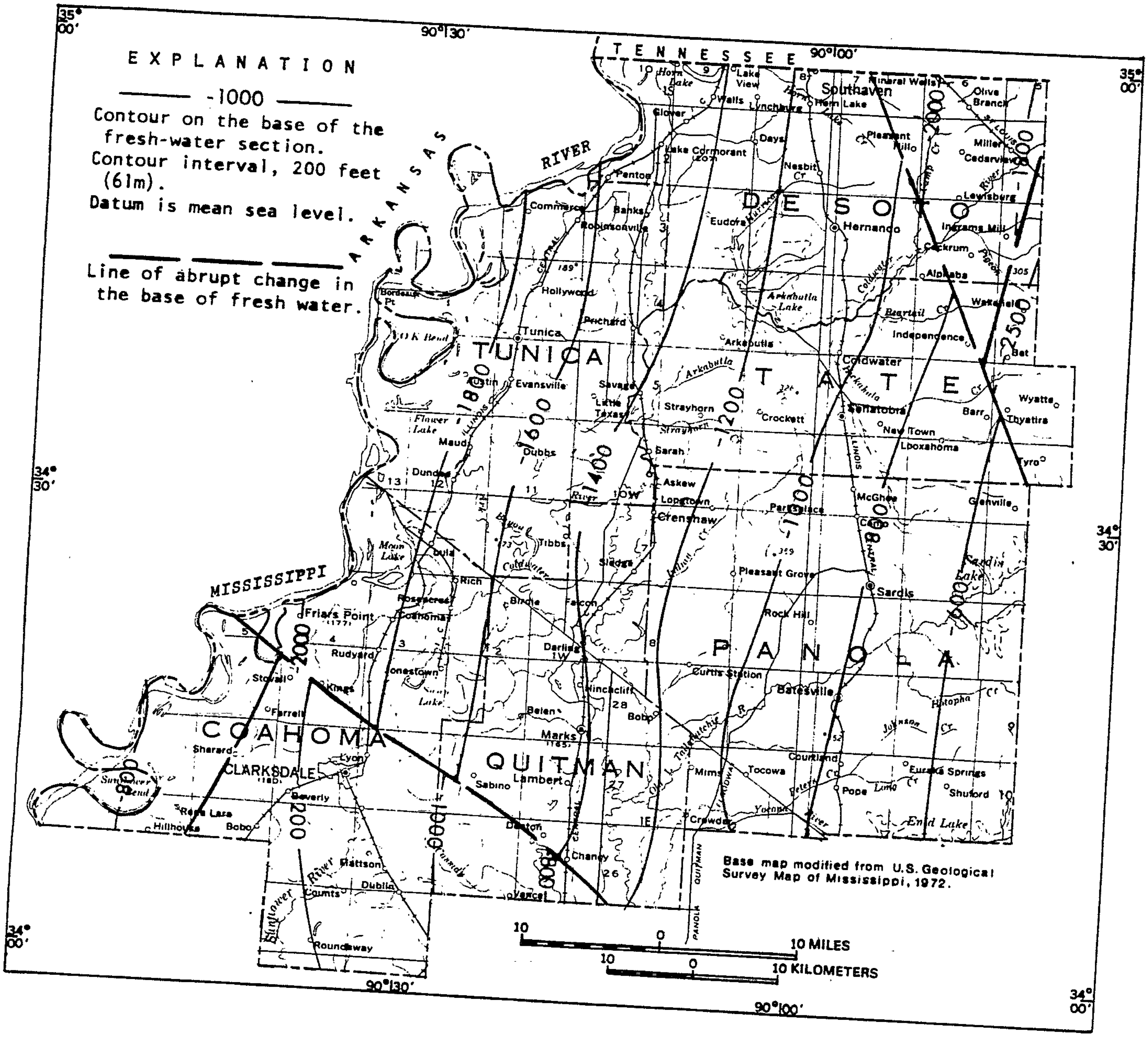


Figure 16.--Configuration of the base of the fresh-water section.

The thickness of the lower Wilcox aquifer ranges from 50 to 360 ft (15 to 110 m) in the area where it contains fresh water. Individual sand beds supplying water to major wells are indicated by electric logs to range in thickness from about 50 to 140 ft (15 to 43 m) with 100 ft (30 m) as the average. Sand beds thicker than 250 feet (76 m) in northwestern De Soto County have been reported on driller's logs; thicknesses of at least 180 ft (55 m) have been noted in northern Quitman County (table 1).

The movement of water in the lower Wilcox aquifer is westward. Altitudes of potentiometric surfaces range from about 200 ft (61 m) above sea level in eastern Panola and Tate Counties to less than 190 ft (58 m) in the remainder of the study area. Many lower Wilcox wells still flow in the parts of Coahoma, Panola, Quitman, and Tate Counties that are in the Mississippi Alluvial Plain; however, pumps are now used on most wells because of substantial losses of artesian pressure associated with increasing water withdrawal during the past several years. Water levels of nonflowing wells in the Mississippi Alluvial Plain range from 0 to about 30 ft (0 to 9 m) below land surface, which is at an altitude of 140 to 210 ft (43 to 64 m). Water levels in wells outside the Mississippi Alluvial Plain range from 50 to 180 ft (15 to 55 m) below land surface, which is at an altitude of 200-580 ft (61 to 177 m).

Most of the major wells now producing water from the lower Wilcox are in Panola, Quitman, Tate, and Tunica Counties. Wells in these counties produce 100 to 1,000 gal/min (6 to 63 l/s); however, the aquifer is capable of much larger yields in many places. Measured specific capacities[1] range from 4.5 to 27 (gal/min)/ft, or 1-6 (l/s)/m, of drawdown--the average is 15 (gal/min)/ft, or 3 (l/s)/m.

Several pumping tests in the area indicated transmissivity[2] (transmissibility) values ranging from 3,300 to 8,000 $(ft^3/d)/ft$, or 306 to 740 $(m^3/d)/m$. Hydraulic conductivity (permeability) values, as indicated by these tests, range from 29 to 64 $(ft^3/d)/ft^2$, or 9 to 20 m/d, and average 41 $(gal/d)/ft^2$, or 13 m/d.

Water from lower Wilcox wells in the area is a sodium bicarbonate type. Hardness does not exceed 21 mg/l. With the exception of several wells in Coahoma and Quitman Counties, the dissolved-solids concentration is not greater than 300 mg/l. Chemical analyses show iron in solution ranging from 0.01 to 0.90 mg/l but generally less than 0.3 mg/l. The pH is 7.2 to 8.7. There is little or no color to the water, and water temperature ranges from 20° to 28°C, depending on the depth of the well.

Minor Wilcox Aquifers

Several discontinuous beds of sand occur between the Meridian-upper Wilcox aquifer and the lower Wilcox aquifer. These sand beds, which average about 50 ft (15 m) in thickness, are 40 to 100 (12 to 30 m) and 25 to 60 ft (8 to 18 m) thick in Panola and Quitman Counties, respectively. Elsewhere, the sand beds may be represented by a few to several beds 10 to 20 ft (3 to 6 m) in thickness.

A few large-capacity wells in Panola County tap the minor Wilcox aquifers. These wells range from 823 to 966 ft (251 to 294 m) in depth and yield 80 to 750 gal/min (5 to 47 l/s); the higher yields are in Panola County. Water levels outside the Mississippi Alluvial Plain are 255 and 200 ft (78 and 61 m) above sea level at Sardis and in the Pope-Courtland area, respectively. A well at Crowder, in the Mississippi Alluvial Plain, flows. Analysis of a pumping test in Panola County indicated a transmissivity of 800 $(ft^3/d)/ft$, or 75 $(m^3/d)/m$; the hydraulic conductivity was 19 $(ft^3/d)/ft^2$, or 6 m/d. Measured specific capacities for wells in these aquifers were 16 and 22 (gal/min)/ft, or 3.5 and 4.5 (l/s)/m.

Water from wells in the minor Wilcox aquifers in Panola County is a sodium bicarbonate type. Hardness is not over 35 mg/l, and the iron concentration is less than 0.3 mg/l. Dissolved-solids concentration is less than 400 mg/l. pH is 7.2 to 8.4, and there is little or no color to the water. Water temperature is 20° to 23°C.

Meridian-Upper Wilcox Aquifer

The Meridian Sand Member of the Tallahatta Formation, together with the uppermost sand beds of the Wilcox Group, is an aquifer throughout the area. The Meridian-upper Wilcox aquifer, ranging in thickness from 50 to 350 ft (15-107 m), is used as a source of water in Coahoma, Quitman, and Panola Counties. In the northern half of De Soto County, the Meridian-upper Wilcox aquifer combines with the lower part of the Claiborne Group to form the Memphis aquifer ("500-foot" sand), which is the principal source of ground water in northern De Soto County and the adjacent Memphis, Tenn., area. The base of the aquifer ranges from near sea level in southeastern Panola County to more than 1,400 ft (427 m) below sea level in western Coahoma County (fig. 19).

The average thickness of the Meridian-upper Wilcox aquifer in the study area, determined from electric logs

[1]Specific capacity is given for a 1-day period of pumping, the data projected if the pumping period is less than 1 day.

[2]The term "transmissivity" replaced "transmissibility" in U. S. Geological Survey terminology in 1972. At that time the units expressing the parameter were changed from gallons per day per foot to cubic feet per day per foot. Similarly, "hydraulic conductivity" replaced "permeability" and the units were changed from gallons per day per square foot to cubic feet per day per square foot. Hydraulic conductivity is calculated by dividing transmissivity by aquifer thickness.

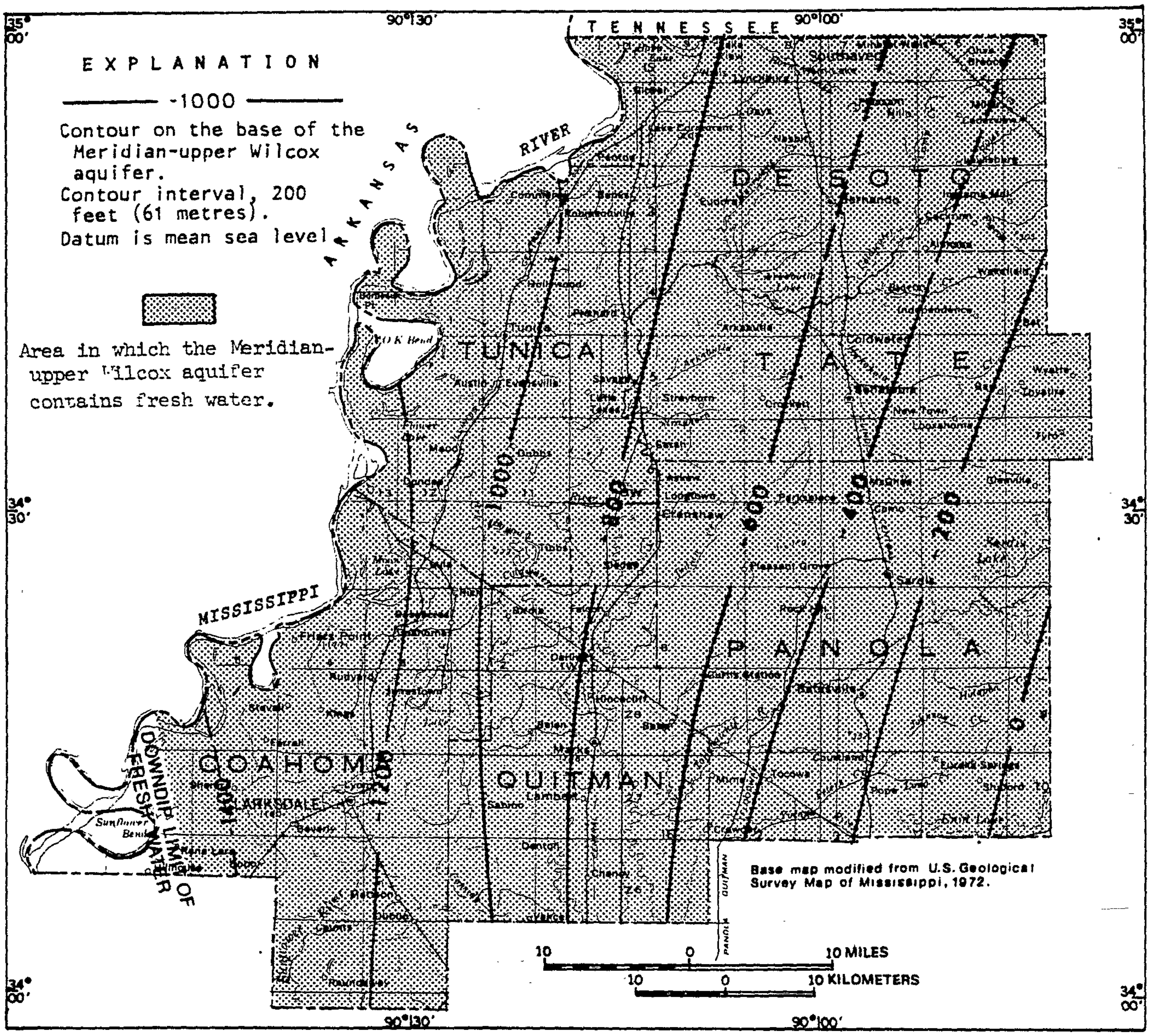


Figure 19.--Fresh-water occurrence in the Meridian-upper Wilcox aquifer.

and driller's logs, is about 220 ft (67 m). The average thickness in Coahoma, De Soto, Panola, and Quitman Counties is about 160 ft (49 m), and in Tate and Tunica Counties it is about 300 ft (91 m). Individual sand beds supplying water to major wells range in thickness from about 45 to 160 ft (14 to 49 m) and the average is 90 ft (27 m). At some locations, discontinuous sand beds are thin and numerous and are separated by thin clay lenses.

The regional movement of water in the Meridian-upper Wilcox aquifer is westward. The potentiometric surface is more than 200 ft (61 m) above sea level in Tate and eastern Panola Counties and between 150 and 200 ft (46 and 61 m) in the remainder of the study area. In turn, water levels in wells range from 13 ft (4 m) above land surface to 114 ft (35 m) below land surface, depending on location and topography. Some wells flow--most of these wells are in the Mississippi Alluvial Plain where land-surface altitudes are low.

Large-capacity wells yield 40 to 650 gal/min (3 to 41 l/s)--average yield is 230 gal/min (15 l/s); and the aquifer is capable of much higher yields in many places. Specific capacities ranging from 2 to 22 (gal/min)/ft of drawdown, or 0.5 to 5 (l/s)/m, have been measured, and the average is 6 (gal/min)/ft, or 1.5 (l/s)/m.

Pumping tests indicated transmissivity ranging from 2,900 to 4,700 $(ft^3/d)/ft$, or 270 to 430 $(m^3/d)/ft$, and hydraulic conductivity ranging from 30 to 68 $(ft^3/d)/ft^2$, or 9 to 21 m/d. The average hydraulic conductivity elsewhere in Mississippi is about 53 $(ft^3/d)/ft^2$, or 16 m/d.

Water in the Meridian-upper Wilcox aquifer is soft and may be either a sodium bicarbonate or calcium bicarbonate type. Dissolved solids exceed 500 mg/l in water from several wells deeper than 1,200 ft (366 m) in Coahoma County. Excessive iron and low pH are problems locally in public supplies-- iron concentration sometimes exceeds 1 mg/l, and pH is as low as 6.1. One chemical analysis indicates a flouride concentration of 1.3 mg/l, which is 0.3 mg/l higher than the recommended maximum concentration (U.S. Public Health Service, 1962). There is little or no color in the water. Water temperature ranges from 19° to 27°C.

Tallahatta Formation

The Tallahatta Formation occurs throughout the study area. It is difficult to differentiate the Tallahatta from the overlying units in the Claiborne Group in the northern two-thirds of De Soto County, and it is hydraulically connected with the overlying Winona Sand throughout most of the project area. Thickness ranges from 50 to 400 ft (15 to 122 m), and the average thickness is slightly more than 200 ft (61 m). The Tallahatta Formation generally contains several thick to very thin sand beds that are separated by clay. The thickness of most sand beds is less than 25 ft (8 m); however, in many places there are water-bearing sand beds 40 ft (12 m) to more than 100 ft (30 m) in thickness that are capable of large yields.

A few major wells produce water from the undifferentiated Tallahatta Formation. Depths of these wells range from about 300 ft (91 m) in eastern Panola County to more than 600 ft (183 m) in central Quitman County, and reported yields average 140 gal/min (9 l/s). Some wells in the Tallahatta flow in the Mississippi Alluvial Plain. Water levels in major wells in eastern Panola County are about 250 ft (76 m) above sea level.

Water in the Tallahatta Formation is soft and may be either a sodium-bicarbonate or sodium-calcium bicarbonate type. Chemical analyses of water from wells in Panola and Quitman Counties indicate a dissolved-solids concentration less than 500 mg/l. Iron concentration is less than 0.3 mg/l, but low pH causes corrosion problems locally. There is little or no color in the water. Water temperatures range from 17° to 20°C.

Sparta Sand

The Sparta Sand is the shallowest, or youngest, principal aquifer of Tertiary age. The Sparta crops out and receives its recharge in parts of De Soto, Panola, and Tate Counties where it is not covered by loess (fig. 5). The Sparta Sand contains fresh water throughout the study area, except where it is missing due to erosion in Panola and Quitman Counties. The base of the Sparta Sand ranges from about 200 ft (61 m) above sea level in the east to about 800 ft (244 m) below sea level in the west (fig. 20). The dip is about 20 ft/mi (4 m/km).

In most of De Soto County, the Sparta Sand is equivalent to the upper part of the Memphis aquifer and is difficult to differentiate from the underlying Tertiary and overlying terrace deposits, all of which are hydraulically connected. In the southern third of De Soto County the Sparta Sand and underlying Tertiary deposits undergo a lateral transition (facies change) to more distinct deposits of sand and clay. In the study area, the Sparta Sand in most of De Soto County also includes beds that may be equivalent to the Zilpha Clay, Winona Sand, and Tallahatta Formation. Highly permeable sands in these deposits are numerous and very thick. South of the transition zone in De Soto County, the Sparta Sand becomes a more distinct unit.

In western Coahoma County, the Cockfield Formation may be present between the Cook Mountain Formation and the Mississippi River valley alluvial aquifer, and in western Tunica County both the Cook Mountain and Cockfield Formations may be present between the Sparta Sand and the Mississippi River valley alluvial aquifer. These units also are difficult to distinguish from the Sparta Sand. The Mississippi River

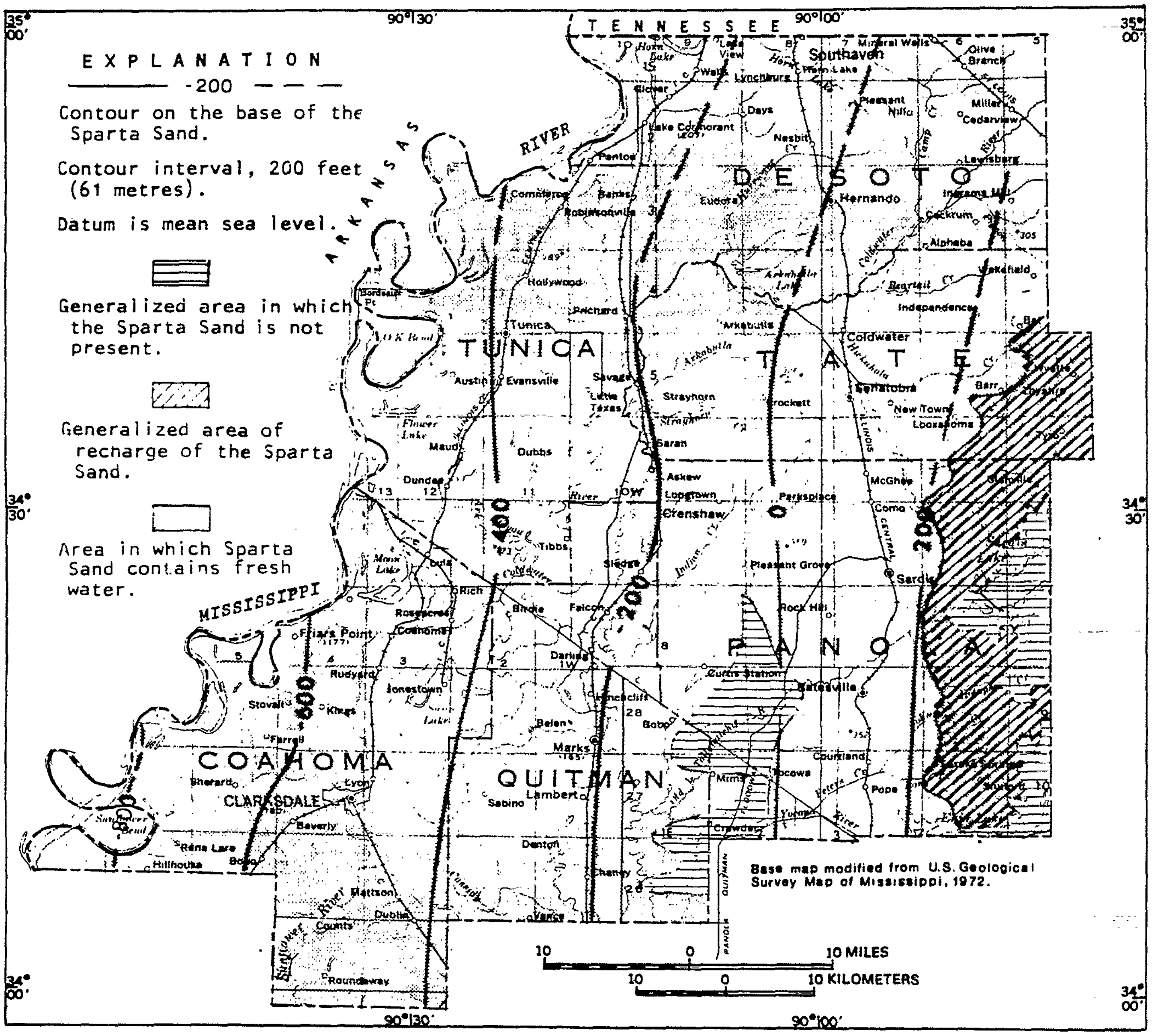


Figure 20.--Fresh-water occurence in the Sparta Sand.

valley alluvial aquifer is in places hydraulically connected to the Sparta Sand.

Thickness of the Sparta Sand ranges from 240 to 800 ft (73 to 244 m) in De Soto County; 420 to 480 ft (128 to 146 m) in Coahoma County; 300 to 350 ft (91 to 107 m) in Tunica County; 100 to 350 ft (30 to 107 m) in Tate County, 0 to nearly 200 ft (30 to 61 m) in Quitman County; and 0 to 200 ft (0 to 61 m) in Panola County. Water-bearing sands in the Sparta Sand, many 100 ft (30.5 m) or more in thickness, are separated by varying thicknesses of clay.

The regional movement of water in the Sparta Sand is from east to west, as in most other aquifers of Tertiary age in the study area. However, heavy pumping in the Memphis metropolitan area (Tennessee and Mississippi) has caused the water level in the Sparta Sand to decline more rapidly in De Soto County than in other parts of the project area. In the Mississippi Alluvial Plain, water levels are 5 to 80 feet below land surface (2 to 24 m), and the average is 42 ft (13 m); the altitude of the potentiometric surface ranges from about 90 to 163 ft (27 to 50 m) above sea level. East of the Mississippi Alluvial Plain, water levels are 50 to 160 ft (15 to 49 m) below land surface, and the average is about 100 ft (30 m); the altitude of the potentiometric surface here ranges from about 170 to 280 ft (52 to 85 m) above sea level.

The most productive public and industrial water-supply wells in the six-county area are screened in the Sparta Sand. Most of these wells are in Coahoma and De Soto Counties; however, several large wells are in Panola and Tate Counties. Large wells made in the Sparta Sand produce 100 to 3,000 gal/min (6 to 190 1/s), and the average is about 800 gal/min (50 1/s). Some wells in De Soto and Coahoma Counties pump 1,000 gal/min (63 1/s) or more, and specific capacities are high, ranging from 18 to 65 (gal/min)/ft, or 4 to 14 (1/s)/m.

The estimated transmissivity for the total thickness of the Memphis aquifer in the Memphis area is 53,000 $(ft^3/d)/ft^2$ or 5,000 $(m^3/d)/m$, and the hydraulic conductivity is about 74 $(ft^3/d)/ft^2$, or 22 m/d, according to Criner, Sun, and Nyman (1964). The Sparta Sand in De Soto County north of the zone of transition probably has transmissivity similar to that of the Memphis aquifer. The average hydraulic conductivity of the Sparta Sand in Mississippi is 67 $(ft^3/d)/ft^2$, or 20 m/d; hence, under confined conditions a water-bearing sand 100 ft (30 m) thick would have a transmissivity of 6,700 $(ft^3/d)/ft$, or 620 $(m^3/d)/m$.

Water from the Sparta Sand in the area may be either a calcium-magnesium bicarbonate or a sodium bicarbonate type. Water from most wells does not exceed 60 mg/l in hardness, but in some areas of Coahoma and De Soto Counties the hardness ranges from 150 to 290 mg/1. Friars Point is the only place where water in the Sparta Sand has a dissolved-solids concentration greater than 500 mg/1. Excessive iron in solution is a common problem locally in public supplies; low pH, which can cause corrosiveness and unsuitability of water for many industrial uses, is also common. There is little or no color in the water. Water temperature ranges from 16° to 22°C.

Mississippi River Valley Alluvial Aquifer

The Mississippi River valley alluvial aquifer, bordered on the west by the Mississippi River and on the east by steep, loess-covered hills, is the most productive aquifer in the six-county study area, although it is not as extensive areally as the other principal aquifers. It occupies slightly more than half of the study-area surface, including all of Coahoma, Quitman, and Tunica Counties, the western portions of De Soto and Tate Counties, and southwestern Panola County(fig. 5). A report by Harvey (1956) states that the alluvial deposits of the Mississippi River, consisting of clay, silt, sand, and gravel, are as much as 200 ft (61 m) thick and average 140 ft (43 m). The lower part of the Mississippi River valley alluvial aquifer consists of coarse sand and gravel which grades upward through coarse sand, fine sand, silt, and clay. In places, it is probably hydraulically connected to the underlying deposits of the Claiborne Group.

Precipitation (to a large extent), the Mississippi River, and probably in places in underlying Claiborne Group, all serve to recharge the Mississippi River valley alluvial aquifer. During most of the year, when ground-water levels are high, water from the aquifer seeps into streams. Water levels in nearby wells directly reflect the stage of the Mississippi River. Except near points of heavy pumping, water levels in wells are generally between 5 and 30 ft (2 and 9 m) below land surface.

Principal uses of water from the Mississippi River valley alluvial aquifer are for irrigation and industry. Large wells produce between 600 and 5,000 gal/min (38 and 315 1/s). Specific capacities of large wells are usually between 75 and 150 (gal/min)/ft, or 16 and 32 (1/s)/m.

Water in the Mississippi River valley alluvial aquifer is a hard, iron-rich, calcium magnesium-sodium bicarbonate type. Dissolved solids range from 150 to 400 mg/1. The iron concentration ranges from about 2 to 14 mg/1. Flouride ranges from 0.0 to 0.4. pH is 6.5 to 8.5--the average is 7.6. There is little or no color in the water. Water temperature, which may be affected somewhat by the seasonal fluctuations in air temperature, ranges from 16° to 19°C.

Water Wells

The hydraulic-rotary method is used to drill most of the wells in the project area. Industrial and municipal-supply wells, which are mostly made in the Tertiary aquifers, are constructed by casing the initial drill hole to the top of the aquifer. The annular space

MISSISSIPPI
STATE GEOLOGICAL SURVEY

WILLIAM CLIFFORD MORSE, Ph.D.
Director

BULLETIN 78

MARSHALL COUNTY GEOLOGY

By

FRANKLIN EARL VESTAL, M.S.

UNIVERSITY, MISSISSIPPI
1954

Reference 19

MARSHALL COUNTY GEOLOGY

FRANKLIN EARL VESTAL, M. S.

INTRODUCTION

Marshall County, an area of 689 square miles,[1] is the westernmost, except for DeSoto, of the six Mississippi counties which border Tennessee (Figure 1). It is bounded on the east by Benton and Union Counties, on the south by Lafayette, and on the west by Tate and DeSoto. Roughly, the county lies within a quadri-

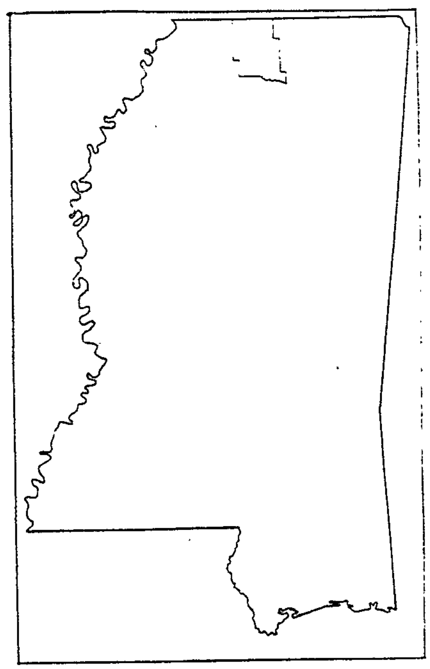


Figure 1.—Location of Marshall County.

lateral formed by the parallels of 34°30′ and 35° north latitude, and the meridians of 89°15′ and 89°45′ west longitude.[2] Its maximum east-west straight-line length is 27 miles, and its greatest north-south extent is 34 miles. All boundary lines are straight with the exception of the eastern half of the southern boundary-line, which is the Tallahatchie River. The boundary-line on the east is offset in two places, so that in the southeastern corner of the county it is 6 miles east of its position in the northeastern corner. The western boundary-line also is offset in such a way

PHYSIOGRAPHY

PROVINCES, TOPOGRAPHY, RELIEF

Marshall County is in the North Central Hills physiographic province, except for a strip along the western border, which is part of the Loess or Bluff Hills province. As the names indicate, the surface is hilly. Viewed from the air, the county appears a complex of hills, ridges, and valleys, decidedly more rugged through the central and eastern and northeastern parts, and much more of the western half occupied by valley flats and other areas of slight relief. In a few places, notably at and a little below some valley heads, and where the lateral planation of streams has been especially effective, slopes are steep, even precipitous. The southeast wall of the lower reaches of Tippah River Valley is a good example of steepening by the second process named; the heads of small tributaries of Chewalla Creek southeast of Higdon afford excellent examples of the first. Also, the so-called "mountains," high hills capped with sandstone, commonly have relatively steep slopes toward their tops. As a whole, however, the topography expresses the mature stage of the cycle of erosion — thorough stream dissection of the terrane, which has left comparatively little upland flat surface; moderate to gentle slopes; flats developed along the streams from their mouths well up toward their heads, and terraces or second bottoms bordering the flood plains of the larger streams; region as a whole well drained by a complex of streams forming a dendritic pattern. The general slope of the surface is south to southwest in the southern part, north to northwest in the northern, and west in the western part. In fact, the over-all slope radiates from Holly Springs, which is situated at one of the highest parts of the county.

As stated, the surface is in general at the mature stage of the erosion cycle. However, several upland remnants remain, the upper surfaces of which have undergone little erosion, and have only slight relief. They are remnants of an old plateau which sloped gently southward and westward. Some of these level patches of the old surface are prominent in Marshall County, especially in the northern part.[15] The clear evidence that the stream-trenched north-south belt of upland of which Marshall County is a part is a dissected plateau, led to the designation parts of the county, and the Pleistocene Loess is spread over a wide territory, being thicker in the west, and thinning eastwards.

The Wilcox and Claiborne beds both have a regional dip of 15 to 20 feet a mile or less, varying in direction from north of west to northwest, but surface features seem to indicate local changes, even reversals. These structural irregularities in the outcropping strata possibly signify structural conditions in the underlying Paleozoic beds which could serve as traps for the accumulation of oil and gas.

The major stratigraphic units which crop out in Marshall County are named, classified (and briefly described) below, in older to younger order, reading from the bottom upward:

GENERALIZED SECTION OF ROCK UNITS EXPOSED IN MARSHALL COUNTY

	Thickness feet
Cenozoic group	
Quaternary system	
Holocene series	
Recent formation	
Alluvium: Gravel, sand, silt, and clay underlying flood plains, est. 50 to	75.0
Unconformity	
Pleistocene series	
Loess formation	
Silt, massive, gray and brown; est. maximum	20.0
Unconformity	
Tertiary system	
Pliocene series	
Citronelle formation	
Gravel, sand, silt, and clay, irregularly bedded; max.	25.0
Unconformity	
Eocene series	
Claiborne sub-series	
Kosciusko formation	
Sand, sandstone: sand white to brown, red-brown, and other iron oxide colors; massive to cross bedded;	

coarse and gritty to fine, micaceous; sandstone ferruginous, coarse-grained to fine-grained, blocky. A little quartzite and some re-worked clay and shale toward the base; est. up to 100.0

Unconformity

Zilpha formation (doubtfully represented)

Clay shale and clay, light gray to dark gray; contains concretions of siderite 8.0

Winona formation (doubtfully represented)

Sand, deep red, and irregular sandstone, coarse to medium ....

Tallahatta formation

Clay shale, silt shale, siltstone, sand, sandstone, silty limonite; shale gray to brown or black lignitic or white, and well bedded; sand fine, micaceous, white to various iron colors; sandstone fine-grained ferruginous; crusts and thin layers and some masses of varicolored silty limonite or limonitic siltstone 200.0

Meridian formation

Sand, coarse and gritty to fine white, pale yellow, brown and red brown micaceous massive to cross bedded; some ferruginous sandstone; maximum 225.0

Unconformity

Wilcox sub-series

Ackerman formation

Sand, silt, clay, lignite, iron ore: Irregular lenses and other bodies and discontinuous beds of sand, silt, and clay; sand coarse and gritty to fine; white to brown and red; silt and clay gray to black and blue and green and white; beds and concretionary masses of iron carbonate and oxide; maximum 300.0

Fearn Springs formation

Shale, clay, sand, silt, iron ore: Shale gray to greenish gray or yellowish sandy and silty; clay gray to white; sand fine white, masses of iron ore abundant towards top of formation; maximum 100.0

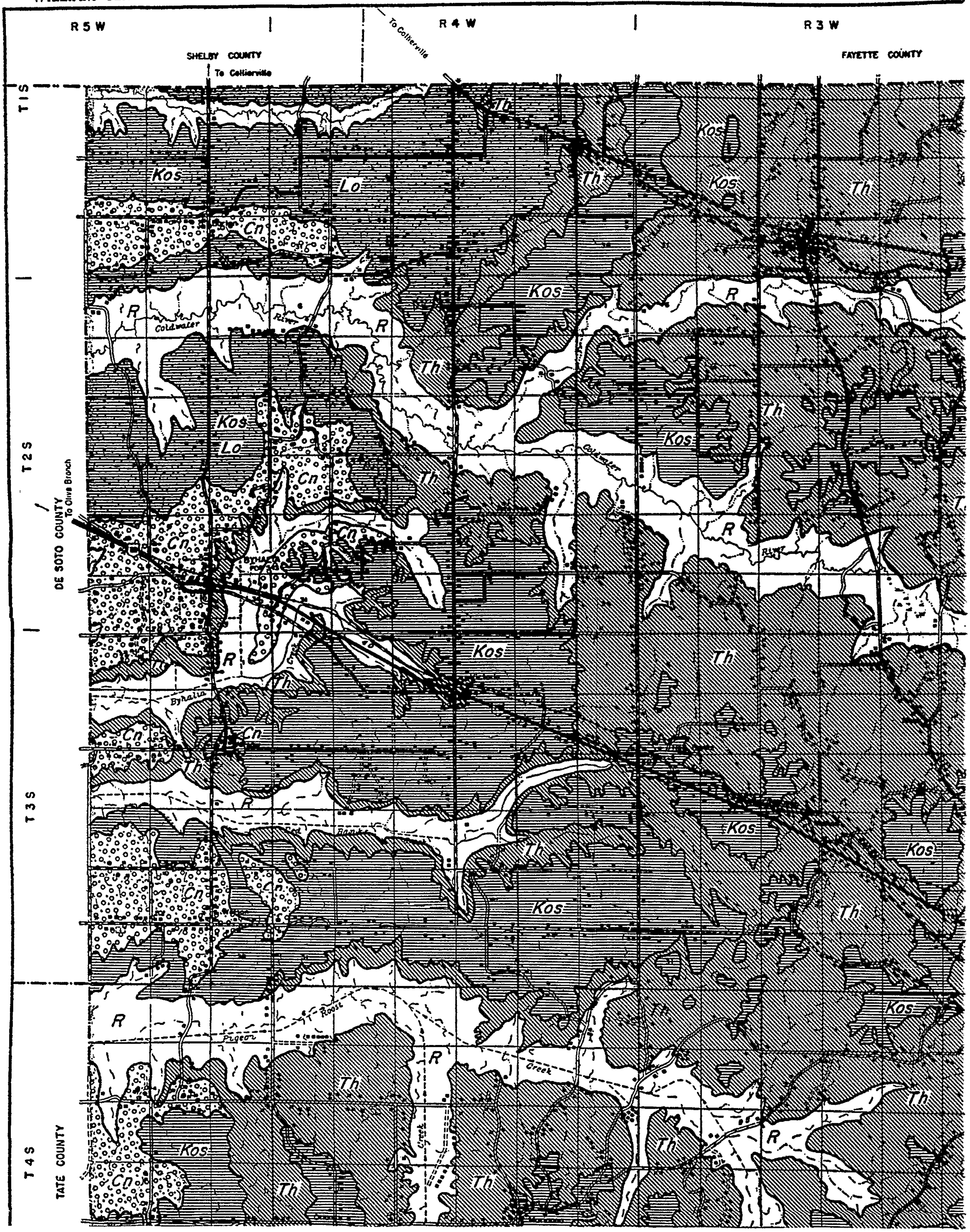
Unconformity

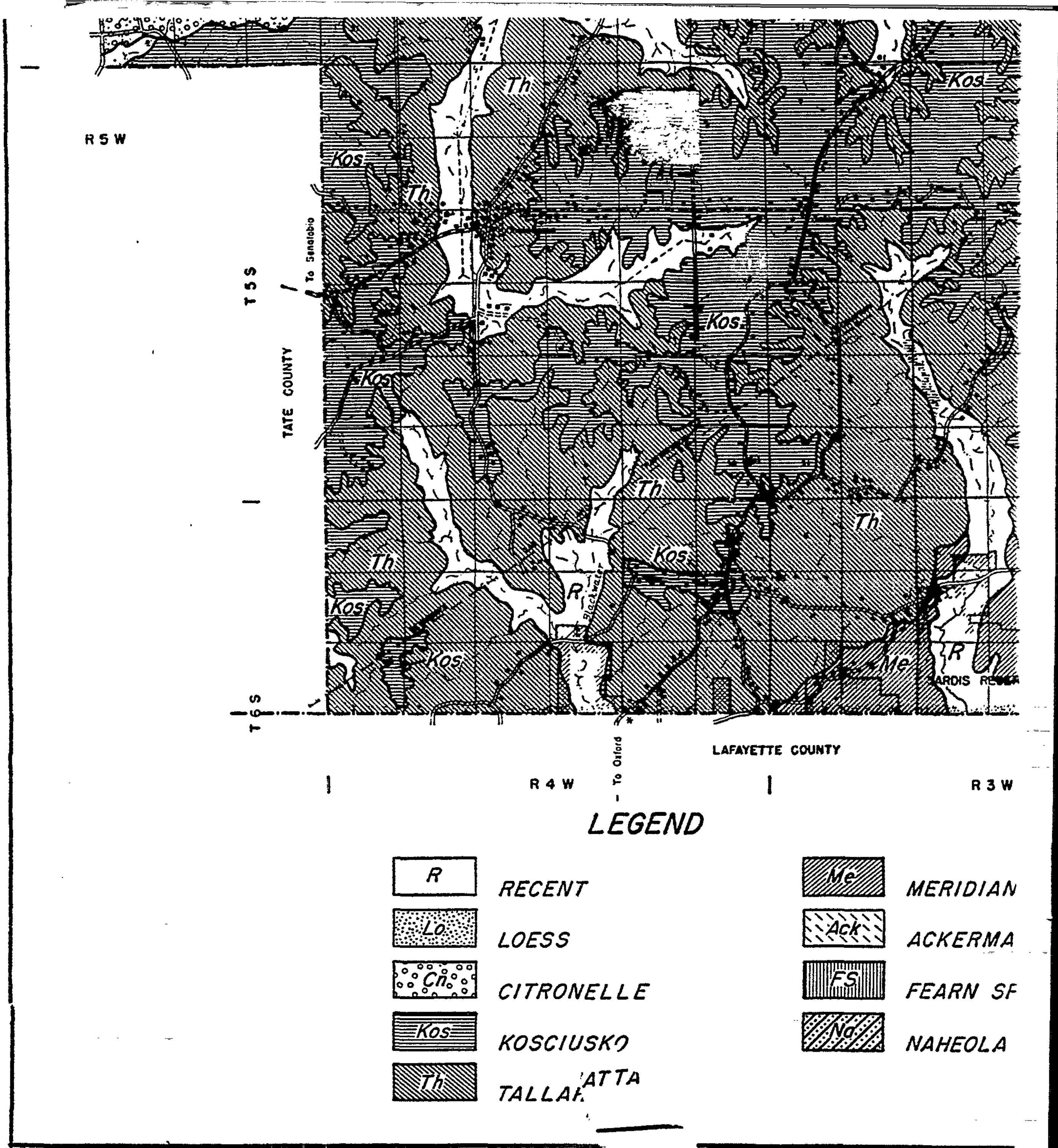
Midway sub-series

Naheola formation

Clay shale, clay, sand, iron ore; Shale gray to black sandy and silty well bedded, interbedded with thin layers of fine gray sand; contains concretions and thin seams of iron carbonate and oxide; maximum 100.0

MISSISSIPP STATE GEOLOGICAL SURVEY
WILLIAM CLIFFORD MORSE, DIRECTOR




R 5 W
T 5 S
To Senatobia
TATE COUNTY
T 6 S
To Oxford
LAFAYETTE COUNTY
R 4 W
R 3 W
Th
Kos
Kos.
R
Me
Blackwater
SARDIS RESER
LEGEND
R RECENT
Lo LOESS
Cn CITRONELLE
Kos KOSCIUSKO
Th TALLAHATTA
Me MERIDIAN
Ack ACKERMA
FS FEARN SF
Na NAHEOLA

STATE OF MISSISSIPPI
DEPARTMENT OF ENVIRONMENTAL QUALITY
JAMES I. PALMER, JR.
EXECUTIVE DIRECTOR

REC'D.
OCT 19 1994
WPB-SAS

October 17, 1994

Mr. Brian Farrier
Site Investigation and
Support Branch
Waste Management Division
U.S. EPA - Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

RE: Preliminary Assessment (PA) Report
True Temper Sports, Inc.
MSD982095713
Olive Branch, DeSoto County, Mississippi

Dear Brian:

Enclosed is the above referenced report. Please contact Bill Gilliland, (601)961-5066, if you have any questions.

Sincerely,

Phillip Weathersby

Phillip Weathersby
CERCLA Section, Chief

PW:bgpl001
Enclosure

Sites," OSWER Directive 9345.1-08). If during any stage of the PA investigation you come across information that leads you to believe the site might be eligible for RCRA Subtitle C corrective action, notify your Regional EPA site assessment contact, who will discuss the situation with representatives of the RCRA program and decide whether to proceed with CERCLA investigative activities.

Table 2-1
RCRA Eligibility Checklist

1. Has the facility treated, stored, or disposed any RCRA hazardous waste for any period of time since November 19, 1980? (If the facility or site is a known "protective filer," check no.)

   ☒ Yes ☐ No

   IF THE ANSWER TO QUESTION 1 IS "NO", STOP; SITE IS NOT ELIGIBLE FOR RCRA RESPONSE.
   IF YES, CONTINUE WITH CHECKLIST.

2. Does the facility currently have a RCRA Part B Operating Permit or a post-closure permit?

   ☐ Yes ☐ No

3. Did the facility file a Part A Permit Application? ☒ Yes ☐ No

   If yes,

   - Does the facility currently have interim RCRA status? ☐ Yes ☐ No
   - Did the facility convert its status from TSF to "Generator" or "Non-handler"?

     ☐ Yes ☐ No

   If no,

   - Is the facility a "Non- or Late Filer"? ☐ Yes ☐ No

IF ANSWERS TO ALL QUESTIONS IN PARTS 2 AND 3 ARE "NO," THE SITE IS NOT ELIGIBLE FOR RCRA RESPONSE. IF THE ANSWER TO ANY QUESTION IS "YES," DISCUSS THE SITE WITH YOUR EPA SITE ASSESSMENT CONTACT.

2.2.2 CERCLA Petroleum Exclusion

CERCLA authorized Federal response to releases or threatened releases of "hazardous substances" and "pollutants and contaminants." CERCLA excludes "petroleum, including crude oil or any fraction thereof" from the definition of these terms. However, CERCLA does not define the specific types of petroleum products excluded.

Sse = 0
Sa = Not scored

HAZARDOUS RANKING SYSTEM PRELIMINARY SCORE
for
TRUE TEMPER SPORTS, INC.
OLIVE BRANCH, DESOTO COUNTY, MISSISSIPPI
MSD982095713

Waste Characteristics

A hazardous waste quantity of 10 was assigned and used for the groundwater and surface water pathways. There is no known soil contamination, therefore, the soil pathway was not scored. The air pathway was not scored. This value, 10, was based on an estimated 3000 pounds per month for three months that generally may be in storage prior to disposal.

Groundwater

The groundwater pathway was evaluated on the potential to release. No analytical data is present to document contamination of the surficial aquifer.

Surface Water

The surface water was evaluated on the potential to release. No analytical data is available to document contamination of the surface water pathway. The distance from the facility to the nearest perennial stream is about 3.6 miles.

Soil

There is no known soil contamination at this facility.

Air

The air pathway was not evaluated.

Facility score - 0.93

Sgw = 1.86
Ssw = 0.00
Sse = 0
Sa = Not scored

Department of Environmental Quality

ENGINEERING CHART

SHEET NO. 1 OF 1

FILE

APPN

DATE

BY Bill Gilliland

SUBJECT True Temper Sports, Inc.
Olive Branch, DeSoto County, MS MSD982095713

CALCULATION OF H.R.S. SCORE

Pathway	Release	Score	$Score^2$
Groundwater Pathway Score	Potential	1.86	3.46
Surface Water Pathway Score	Potential	0.01	0.00
Soil Exposure Pathway Score	No soil contamination		—
Air Migration Pathway Score	Not scored		—
		Total	3.46

$$\text{Facility Score} = \sqrt{\frac{3.46}{4}}$$

$$\text{Facility Score} = 0.93$$

Department of Environmental Quality

ENGINEERING CHART

SHEET NO. 1 OF 12

FILE

APPN

DATE

BY Bill Gilliland

SUBJECT True Temper Sports, Inc.
Olive Branch, DeSoto County, MS
MSD982095713

GROUNDWATER MIGRATION PATHWAY SCORESHEET

Aquifer -

Likelihood of Release to an Aquifer

1. Observed Release
   No observed release to the groundwater 0

2. Potential to Release

2a. Containment
Table 3-2
9

2b. Net Precipitation
Annual precipitation - 51 inches
Annual lake evaporation - 41 inches
Net precipitation - 10 inches
Table 3-4
Greater than 5 to 15 3

2c Depth to Aquifer
Aquifer depth - 60 feet
Contamination depth - No contamination
Table 3-5
3

2d. Travel Time
Table 3-6
10^{-4}
Table 3-7
Greater than 5 to 100 15

Department of Environmental Quality

ENGINEERING CHART

SHEET NO. 2 OF 12

FILE

APPN

DATE

BY

SUBJECT True Temper Sports, Inc.
Olive Branch, DeSoto County, MS
MSD 982095713

2e. Potential to Release
[lines 2a (2b+2c+2d)]
9(3+3+15) — 189

3. Likelihood of Release
(higher of lines 1 and 2e) — 189

Waste Characteristics

4. Toxicity/Mobility

Substance	G.W. Mobility H.S.R.	Toxicity H.S.R.	Tox/Mob Tab. 3-9
Toluene	0.01	10	0.1
Methyl Ethyl Ketone	1	10	10
Carbon Disulfide	0.01	1000	10
Isobutanol	1	10	10
Pyridine	1	1000	1000
Benzene	1	100	100

Highest Value 1000

5. Hazardous Waste Quantity
Table 2-5; Tier B ; Weight - estimated 3,000 lbs/month for 3 months
9000 lbs ÷ 5000 = 1.8

Table 2-6
1.8 < 10 thus assigned value — 10

6. Waste Characteristics
Tox/Mob X Haz. Wa. Quan.
$(1 \times 10^3) \times (1 \times 10^1) = 1 \times 10^4$
Table 2-7 — 10

Department of Environmental Quality

ENGINEERING CHART

SHEET NO. 3 OF 12

FILE

APPN

DATE

BY

SUBJECT True Temper Sports, Inc.
DeSoto

7. Nearest Well

Home well at a distance of 2650 feet
Northeast of the facility
Table 3-11 — 9

8. Population

8a. Level I Concentrations — 0

8b Level II Concentrations — 0

8c. Potential Contamination

Distance Mile(s)	# Home Wells	# Public Wells	# Public Well Conn.	Total Popul.	Value Tab. 3-12	
0 - 1/4	0	0	0	0	0	
1/4 - 1/2	0	0	0	0	0	
1/2 - 1	3	2 (Indust)	20	1009	523	(1000 employees)
1 - 2	16	0	0	47	10	
2 - 3	12	0	0	35	7	
3 - 4	14	11	771	2,284	131	
				Total	671	

1990 Census - 2.91 persons/household

PC = 1/10 (674) — 67.1

8d. Population
(lines 8a + 8b + 8c)
0 + 0 + 67.4 — 67.1

9. Resources

Water in Terrace aquifer & Cockfield aquifer could be used for drinking — 5

10. Wellhead Protection Area

Mississippi has no wellhead protection program — 0

Department of Environmental Quality

ENGINEERING CHART

SHEET NO. 4 OF 12

FILE

APPN

DATE

BY

SUBJECT True Temper sports, Inc.
DeSoto

11. Targets
(lines 7 + 8d + 9 + 10)
9 + 67.1 + 5 + 0 — 81.1

Groundwater Migration Score for an Aquifer

12. Aquifer Score
[(lines 3 x 6 x 11) ÷ 82,500]
(189 x 10 x 81.1) ÷ 82,500 — 1.86

Groundwater Migration Pathway Score

13. Pathway Score
(value from line 12) — 1.86

Department of Environmental Quality

ENGINEERING CHART

SHEET NO. 5 OF 12

FILE

APPN

DATE

BY

SUBJECT True Temper Sports, Inc
DeSoto

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

DRINKING WATER THREAT

Likelihood of Release

1. Observed Release
   No observed release to the surface water — 0

2. Potential to Release by Overland Flow

2a. Containment
Table 4-2
No evidence of substance migration
from contained area — 9

2b. Runoff
Drainage source areas and areas upgradient
Table 4-3
less than 50 acres — 1
Table 4-4
silty loam — C
Table 4-5 ~ 4.1 inches
3.5 or greater — 5
Table 4-6 — 1

2c. Distance to Surface Water
3.6 miles to perennial water
Table 4-7
Greater than 2 miles — 0

2d. Potential to Release by Overland Flow
[line 2a(2b+2c)]
9(1+0) — 9

Department of Environmental Quality

ENGINEERING CHART

SHEET NO. 6 OF 12

FILE

APPN

DATE

BY

SUBJECT True Temper Sports, Inc
Desoto

3. Potential to Release by Flood

3a. Containment (Flood)
Table 4-8 — 10

3b. Flood Frequency
Table 4-9
Above 500 year floodplain — 0

3c. Potential to Release by Flood
(lines 3a X 3b)
10 X 0 — 0

4. Potential to Release
(lines 2d + 3c)
9 + 0 — 9

5. Likelihood of Release
(higher of lines 1 and 4) — 9

Waste Characteristics

6. Toxicity/Persistence

substance	Toxicity H.S.R.	Persist. H.S.R.	Fac. Value Tab. 4-12
Toluene	10	0.4	4
Methyl Ethyl Ketone	10	0.4	4
Carbon Disulfide	1000	0.4	400
Isobutanol	10	0.4	4
Pyridine	1000	1.0	1000
Benzene	100	0.4	40

Highest Value — 1000

Department of Environmental Quality

ENGINEERING CHART

FILE

APPN

DATE

BY

SUBJECT True Temper Sports, Inc
DeSoto

7. Hazardous Waste Quantity
Table 2-5; Tier B; Weight 3000#/month x 3 months
9000 ÷ 5000 = 1.8

Table 2-6
1.8 < 10 thus assigned value — 10

8. Waste Characteristics
Tox/Pers. x Haz. Wa. Quan.
$(1 \times 10^3) \times (1 \times 10^1) = 1 \times 10^4$
Table 2-7 — 10

Targets

9. Nearest Intake
No drinking water intake along the surface water pathway — 0

10. Population

10a. Level I Concentrations — 0

10b. Level II Concentrations — 0

10c. Potential Contamination — 0

10d. Population
(lines 10a + 10b + 10c)
0 + 0 + 0 — 0

11. Resources
Water from Nonconnah Creek could be used for drinking — 5

Department of Environmental Quality

ENGINEERING CHART

SHEET NO. 8 OF 12

FILE

APPN

DATE

BY

SUBJECT True Temper Sports, Inc.
DeSoto

12. Targets
(lines 9 + 10 + 11)
0 + 0 + 5 — 5

Drinking Water Threat Score

13. Drinking Water Threat Score
[(lines 5 X 8 X 12) ÷ 82,500]
(9 X 10 X 5) ÷ 82,500 — 0.005

HUMAN FOOD CHAIN THREAT

Likelihood of Release

14. Likelihood of Release
(Same value as line 5) — 9

Waste Characteristics

15. Toxicity/Persistence/Bioaccumulation

substance	Toxicity H.S.R.	Persis. H.S.R.	Bioacc. H.S.R.	Tox/Pers. Tab 4-12	Tox/Per/Bio. Tab 4-16
Toluene	10	0.4	50	4	200
Methyl Ethyl Ketone	10	0.4	0.5	4	2
Carbon Disulfide	1000	0.4	50	400	2×10^4
Isobutanol	10	0.4	0.5	4	2
Pyridine	1000	1.0	0.5	1000	500
Benzene	100	0.4	5000	40	2×10^5

Highest Value — 2×10^5

16. Hazardous Waste Quantity
(Same value as line 7) — 10

SUBJECT True Temper Sports, Inc.
DeSoto

17. Waste Characteristics
Tox/Pers. X Haz. Wz. Quan. X Bioacc.
$(4 \times 10^1) \times (1 \times 10^1) \times (5 \times 10^3) = 2 \times 10^4$
Table 2-7 — 32

Targets

18. Food Chain Individual
20 X 0.1 — 2

19. Population

19a. Level I Concentrations — 0

19b. Level II Concentrations — 0

19c. Potential Human Food Chain Contamination
Fishery – Nonconnah Creek
$\frac{(w)\ 20\ ft \times (L)\ 15\ mi (5{,}280'/mi)}{43{,}560\ ft^2/acre} = 36.4$ acres
36.4 acres x 20 lbs./acre = 728 lbs. fish
Table 4-18 0.3
Table 4-13 0.1
0.3 X 0.1 = 0.03
PF = 1/10 (0.03) — 0

19d. Population
(lines 19a + 19b + 19c) — 0

20. Targets
(lines 18 + 19d)
2 + 0 — 2

Department of Environmental Quality

ENGINEERING CHART

SHEET NO. 10 OF 12

FILE

APPN

DATE

BY

SUBJECT True Temper Sports, Inc.
DeSoto

Human Food Chain Threat Score

21. Human Food Chain Threat Score
[(lines 14 X 17 X 20) ÷ 82,500]
(9 X 32 X 2) ÷ 82,500 — 0.007

ENVIRONMENTAL THREAT

Likelihood of Release

22. Likelihood of Release
(same value as line 5) — 9

Waste Characteristics

23. Ecosystem Toxicity/Persistence/Bioaccumulation

Substance	Eco. Tox H.S.R.	Persist. H.S.R.	Eco. Bio. H.S.R.	E.T./Per. Tab 4-20	E.T.P.B. Tab 4-21
Toluene	100	0.4	50	40	2000
Methyl Ethyl Ketone	1	0.4	0.5	0.4	0.2
Carbon Disulfide	100	0.4	50	40	2000
Isobutanol	10	0.4	0.5	4	2
Pyridine	100	1.0	0.5	100	50
Benzene	10,000	0.4	500	4000	2×10^6

Highest Value 2×10^6

24. Hazardous Waste Quantity
(same value as line 7) — 10

25. Waste Characteristics
Eco. Tox/Per X Haz. Wa. Quan. X Ecobio. Pot.
$(4 \times 10^3) \times (1 \times 10^1) \times (5 \times 10^2) = 2 \times 10^7$
Table 2-7 — 56

Department of Environmental Quality

ENGINEERING CHART

FILE
APPN
DATE
BY

SUBJECT True Temper Sports, Inc.
DeSoto

Targets

26. Sensitive Environments

26a. Level I Concentrations — 0

26b. Level II Concentrations — 0

26c. Potential Contamination
Table 4-23= 5 ; Table 4-24= 0 ; Table 4-13= 0.1 ;

SP= 1/10 [(0.05)] — 0.05

26d. Sensitive Environments
(lines 26a + 26b + 26c)
0 + 0 + 0.05 — 0.05

27. Targets
(value from line 26d) — 0.05

Environmental Threat Score

28. Environmental Threat Score
[(lines 22 X 25 X 27) ÷ 82,500]
(9 X 56 X 0.05) ÷ 82,500 — 0.000

SURFACE WATER OVERLAND/FLOOD COMPONENT SCORE FOR A WATERSHED

29. Watershed Score
(lines 13 + 21 + 28)
0.005 + 0.007 + 000 — 0.01

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE

30. Component Score
(value from line 29) — 0.01

Department of Environmental Quality

ENGINEERING CHART

FILE

APPN

DATE

BY

SUBJECT True Temper Sports, Inc.
DeSoto

SOIL EXPOSURE PATHWAY SCORESHEET

RESIDENT POPULATION THREAT

Likelihood of Exposure

1. Likelihood of Exposure 0
No contaminated Soil Known

Waste Characteristics

2. Toxicity

substance	Toxicity H.S.R.
N/A	

Highest Value

3. Hazardous Waste Quantity
Table 5-2; Tier ;

N/A

Table 2-6

4. Waste Characteristics
Toxicity X Haz. Wa. Quan
(X10) X (X10) = X10
Table 2-7